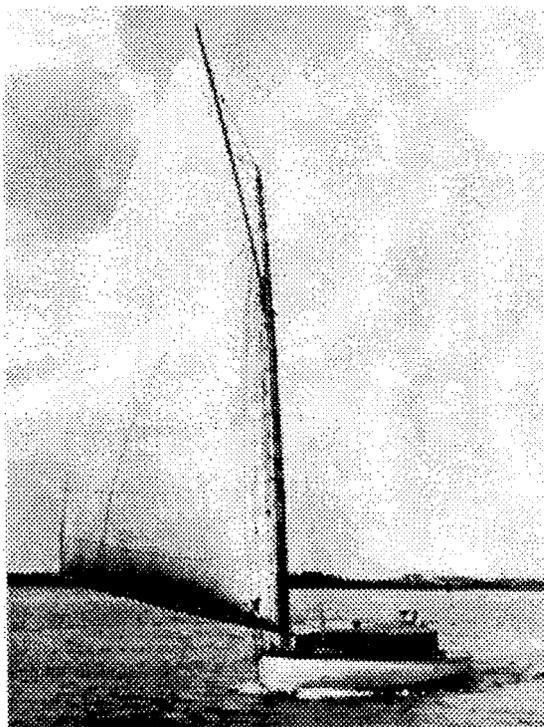


A WATERSHED MANAGEMENT PLAN FOR BARNEGAT BAY

Volume 1: Action Plans

**A Report of the
New Jersey Department of Environmental Protection and Energy
to the New Jersey Legislature,
Ocean County Board of Chosen Freeholders,
Bay Area Municipalities
and the People of Ocean County**

June 1993



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State of New Jersey**

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Cover Photo: Barnegat Bay Catboat "Vim". Built in 1900 by Morton Johnson of Bay Head, NJ and still used to sail the Bay.

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PREFACE

Government jurisdictions, throughout the United States, are grappling with balancing issues of population growth and economic development with the protection of increasingly scarce environmental resources. Meaningful management approaches no longer presume simple trade-offs between economic growth and environmental protection. Instead, they recognize that economic vitality and environmental protection are inextricably tied and related to maintaining and improving an attractive quality of life.

Nowhere is this interdependence between economic development and the environment better illustrated than at the point where the land meets the sea. This Barnegat Bay study and Management Plan provide an opportunity to improve the understanding of this relationship, and to take actions based on that improved understanding. Moving from the Hudson River through Newark Bay to the Hackensack, Passaic and Raritan River basins to the back bays that characterize the Jersey Shore, we experience a variety of water quality, diversity of habitat and range of ecosystem health and vitality. Each of these characteristics is directly related to the density and intensity of land uses as well as the management practices used to protect the environmental resources.

The Barnegat Bay provides an interesting case study. In some ways, in light of the density and intensity of development that surrounds the Bay, it is at an important crossroads. Affirmative management practices are required to maintain the Bay's viability as both a valuable environmental resource and focus of human economic activity. Continued haphazard development will only impair its future viability.

The need for an affirmative management approach leads to a number of fundamental questions for which we are only beginning to develop answers. Are there limits to the development that ought to occur adjacent to the Bay? Might those limits be extended by improving the quality of development around the Bay? Can carrying capacities with respect to Bay resources be established? Are there performance guidelines that ought to be set in line with those established carrying capacities? What are the Best Management Practices to ensure the Bay's future health?

In posing these questions we are just beginning to embark on the quest for meaningful answers, we are proposing to explore both the science and the values associated with the future use of this increasingly fragile, shallow bay ecosystem. The importance of the Barnegat Bay and this study transcend this particular New Jersey estuary.

This study draws from other estuarine studies and will, in turn, add to that growing body of literature. Some of the studies drawn from most heavily are the Chesapeake Bay 2020 Plan, The Puget Sound Water Quality Management Plan, Delaware Lagoon Study and The City of Virginia Beach Back Bay Management Study. By building upon these earlier works, this Barnegat Bay

study will further our understanding of the ecological underpinnings and human use interactions wherever the land meets the sea.

This study also emanates from years of accumulated local experience and knowledge. It was local concern that led to the New Jersey State Legislature's enactment of P.L. 1987, Chapter 397. This Act mandated a study of the Bay and the effects of the area's growth on this important resource.

The focus of this study, which is the Bay, necessarily encourages regional perspective. In this way, this study is consistent with similar studies such as those mentioned above. By regional we mean a perspective that is greater than municipal, but also one that is less than statewide. The region is the Barnegat Bay along with the area drained by the waters that ultimately flow into that Bay. This Barnegat Bay watershed is largely contained within Ocean County. The political, legal and administrative convenience of this situation promises an important future role for Ocean County. Such an approach is consistent with the State Legislative intent in mandating this Study. Historically, regional planning efforts have been plagued by a lack of coincidence between regional resource protection and an appropriate jurisdictional entity to do the job. Ocean County, with the continuing support of its governing body and planning board hopefully avoids this problem.

Finally, it is important to acknowledge the nature of the process that has led to the development of this Plan. The planning process has been interactive, acknowledging the importance of public participation in the development and eventually the implementation of an effective plan. The Plan is the embodiment of a great effort that began with preliminary consultant reports, considerable New Jersey Department of Environmental Protection and Energy activity, and significant contributions from local officials and citizen advisory groups whose members volunteered their valuable time and effort to enhance the value of the Plan. Special thanks are in order here for those volunteer citizens who contributed so much of their time and energy.

We do not expect that this process will abruptly cease with the release of this Watershed Management Plan for Barnegat Bay. To the contrary, we expect that the productive interaction among the various levels of government and between professional and citizen advisory groups will continue as the Watershed Management Plan for Barnegat Bay is eventually implemented. The release of this Plan is closer to the beginning, rather than the end of an important planning process.

EXECUTIVE SUMMARY

The Barnegat Bay, a 75 square mile ecosystem, is an environmentally sensitive estuary, replete with aquatic vegetation, shellfish beds, finfish habitats, waterfowl nesting grounds, and spectacular vistas. Yet, the Bay is relatively shallow throughout, allowing for only slow mixing and flushing, which necessarily leads to the estuary's heightened environmental sensitivity.

The Barnegat Bay drains from an area of approximately 450 square miles. In terms of land uses, the Barnegat Bay watershed area consists of four different sub-areas: the barrier islands which are heavily developed with the exception of Island Beach State Park; the northeastern mainland area which is heavily developed with very little dedicated public open space; the less densely developed southeastern mainland area with protected environmentally sensitive areas such as the Barnegat National Wildlife Refuge and the Manahawkin Fish and Wildlife Management Area; and the western side of the watershed which has very low density development and is protected by the Pinelands Comprehensive Management Plan.

The watershed area is now the year 'round home for nearly 435,000 people, a population which more than doubles during the summer season. Municipalities on the barrier islands bordering the Bay on the east may experience a ten-fold increase in population. Moreover, the entire watershed has undergone dramatic growth since 1950. During the 1980's the municipalities surrounding the Bay reported population expansions that on average exceeded 20%. Boat traffic has also significantly grown on the Bay. This increased traffic is tied to commercial and recreational fishing as well as expanded recreational boating use throughout the State and has raised concerns with respect to both use conflicts and the cumulative impacts on the Bay's water quality.

The intensity of changing land uses surrounding the Bay is having important, and often degrading, effects. Most significantly, water quality in the Bay is being degraded by nonpoint sources of pollution. The relationship between land use and water has been clearly established. Through the natural forces of wind, rain and gravity, what is on the land slowly makes its way to the water unless efforts are taken to prevent this flow. It is expected that the primary cause of this pollution is development on the land and the activities associated with development such as motor vehicle use and lawn and garden maintenance. The proliferation of impervious surfaces exacerbates this situation by reducing the opportunities for infiltration of water and associated pollutants into the soil. No one consciously intends to destroy the environmental quality of Barnegat Bay. Indeed, many of those who may unwittingly contribute to the Bay's gradual degradation are those who most value its beauty and productivity as a natural resource. Yet, it is the cumulative results of seemingly innocuous everyday activities in and around the Bay that are slowly degrading the environmental quality of the Barnegat Bay.

The New Jersey State Legislature recognized this concern with its passage of the Barnegat Bay Study Act, P.L. 1987, Chapter 397 in 1987. The Act defined "bay area" as that area of Ocean County comprising Barnegat Bay and all lands within the Bay area municipalities located between Barnegat Bay and the first public road of the Bay area municipality. However, since the water draining into the Bay emanates from the entire watershed and carries impurities it picks up as it travels across the land, the New Jersey Department of Environmental Protection and Energy (DEPE) and the citizen advisory group expanded the study area to include the entire watershed to enhance its ecological perspective. For ease in planning and because relatively little of the watershed lies within Monmouth County, the Ocean County limit was chosen as the northern boundary of the study area. New Jersey Route 72 was legislatively defined as the southern boundary because it is considered by many to define the geographical difference between Barnegat Bay and Little Egg Harbor. The Act also called for a study of the nature and extent of the impact of development upon the Bay, the creation of a Barnegat Bay Study Group to supervise this study, and development of an appropriate land use and environmental management plan for consideration by all levels of government.

Once constituted pursuant to the Act, the Barnegat Bay Study Group and the DEPE responded by embarking on a three-phased study. The first phase of the study was completed in March 1990. That phase culminated in a report entitled Profile of the Barnegat Bay. The Profile provides a characterization of existing conditions and anticipated trends with respect to Bay water quality. It also importantly identifies a number of data gaps, suggesting directions for further future inquiry.

The second phase of the study was completed in August 1990. This phase resulted in a report entitled Management Recommendations for the Barnegat Bay. It suggests a number of management initiatives, building on the information presented in the earlier Profile of the Barnegat Bay.

Finally, the third phase of the study is represented by A Watershed Management Plan for Barnegat Bay. However, the Plan itself only partially represents the extensive planning process which was undertaken to produce it. This process included the interaction between a citizen advisory group and DEPE personnel over a four-year period. The watershed management plan presents a multi-objective management approach directed at achieving meaningful and measurable improvement to the quality of life and natural resources of the Barnegat Bay.

A Watershed Management Plan for Barnegat Bay is divided into seven chapters, each with a set of individual action plans. The seven chapters are the following: Watershed Management, Sensitive Areas Protection, Water Area and Use, Fisheries Management, Public Access, Public Participation and Education, and Research and Monitoring. The action plans each include a rationale and identification of implementation requirements. Ideally, all of these recommended actions will be implemented. However, in recognition of

anticipated constraints, the following management recommendations were recognized as priorities.

Education - Watershed Association

A theme that runs throughout the plan is that of the need for public outreach and education. Effective long term improvement of the ecosystem and quality of life in the Barnegat Bay watershed is dependent upon all residents and users of the area understanding the role that each of us plays in the health of the Bay.

A key component of this educational process and a priority action will be the establishment of a Barnegat Bay Watershed Association by residents of the area. This organization will concentrate on environmental issues within the watershed and serve as an advocate on behalf of the Bay's environmental protection, with education as a primary concern.

Sensitive Areas - Acquisition & Buffers

Another important management recommendation is that of sensitive areas acquisition by both public and private entities. The bayshore is already extensively developed. Many important habitats have been lost, making the remaining ones all that much more critical.

There is also a significant need for sensitive areas, including all water bodies, to be protected by "Best Management Practices", especially provision of sufficient buffers. These buffers will be important in limiting human impact on critical habitats and will reduce the pollutant loading of nonpoint source runoff before it contaminates a river or the Bay and should be provided for through government regulation and purchase and private conservation easements.

Regulation - CAFRA Authority

Resources of the watershed need to be managed by comprehensive regulations which address all probable uses and forms of development. Toward this end, it is important that the Coastal Area Facility Review Act (CAFRA) be amended to include a significant reduction in the size of development which is regulated.

Research & Monitoring

Finally, the Plan recognizes the dearth of data related to the Bay's ecosystem. This situation needs to be remedied by the initiation by DEPE of an effective research, monitoring and assessment process to make future planning more meaningful.

How will the Watershed Management Plan for Barnegat Bay be implemented? No one institutional entity will be charged with the implementation of the Plan. Instead, just as existing conditions are a collective result of individual actions, the plan anticipates that its implementation will be the result of numerous actions by various levels of government, the private sector and, very importantly, individuals through the judicious selection of lifestyle choices. No new planning or regulatory entity is recommended.

Rather, an effort is made to suggest rearrangement and augmentation of existing influence and authority in order to encourage efficiency of planning and regulation.

Obviously, the State of New Jersey, the County of Ocean, and the various municipal jurisdictions that fall within the watershed area will play important roles. The State's most important responsibilities focus less on regulation and involve more provision of technical assistance and funding to local levels of government. However, some legislative changes to coastal zone management practices may also be required in order that they may more comprehensively and effectively protect the coast.

Ocean County government offers special promise with respect to the future management of the Bay. While the watershed area and the boundary of the County do not precisely coincide, they match closely enough to have the County be responsible for serving as the logical regional planning entity to protect this valuable regional resource. Ocean County provides a convenient and effective political and administrative jurisdictional unit which provides both regional perspective and local knowledge. Assigning this Bay-focused regional planning responsibility to the County obviates the need to introduce yet another level of government administration.

Municipalities are urged to make full use of their planning and zoning powers under the Municipal Land Use Law to ensure the protection of the Barnegat Bay. Municipalities would greatly improve the situation by ensuring that plans and zoning are consistent with each other and with this plan and that development applications receive a thorough environmental review. Provisions in the Municipal Land Use Law that encourage regional coordination should be fully employed (N.J.S.A. 40:55D-77-88).

Finally, the proposed Watershed Association is expected to play a key role in implementation. This role will include both public education and serving as a watchdog to monitor the activities of the various levels of government and the private sector to make certain that the Barnegat Bay as a valuable regional resource is adequately protected.

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CHAPTER I: INTRODUCTION

BARNEGAT BAY...Seventy five square miles of richly populated estuarine ecosystem...Replete with densely vegetated eelgrass beds...Home to the economically important blue crab and hard clam...Year-round nursery for winter flounder...Nesting grounds for the endangered least tern...Critical overwintering site for large numbers of American black ducks and Atlantic brant...Feeding site for populations of otters...Provider of numerous scenic views...Prime recreational area for a variety of waterborne vehicles...Recipient of drainage from 450 square miles of land populated by approximately 433,203 people in winter and two times as many in summer...Provider of 1,739 cubic meters per minute of cooling water for a nuclear generating station...

... an ecosystem at a crossroad, both in terms of its long term viability and in terms of the commitment of the people of New Jersey to provide for sound environmental management.

* * * * *

Barnegat Bay in Ocean County, New Jersey, provides innumerable recreational, economic, and aesthetic benefits for residents and visitors alike; benefits that are strongly dependent upon the overall vitality of the Barnegat Bay ecosystem. And, like watersheds elsewhere, the Barnegat Bay basin is currently experiencing development pressure which is adversely affecting both water quality and the ecosystem in general.

In response to growing concerns about the impacts of development, the New Jersey Legislature passed an Act requiring a study of the nature and extent of development impacts upon the Bay. The Act, P.L. 1987, Chapter 397 (Appendix 1), created the Barnegat Bay Study Group and mandated a study of the Bay and its watershed. In particular, it directed the Study Group and the New Jersey Department of Environmental Protection and Energy (DEPE) to accomplish the following:

1. Assess whether land development in the Bay area has reached such a level that further growth could not be accommodated without a significant effect upon the water quality of Barnegat Bay or the general vitality of the Bay area ecosystem, and, if that level has not yet been reached, determine the extent to which further growth can be so accommodated;
2. Assess the navigability of Barnegat Bay and make recommendations as to how it may be improved;
3. Assess whether boat traffic on Barnegat Bay has reached such a level that additional traffic could not be accommodated without a significant effect upon the water quality of Barnegat Bay or the general vitality of the Bay area ecosystem, or threat to the public health and safety, and, if that level has not yet been reached, determine the extent to which additional traffic can be so accommodated; and

4. Develop appropriate standards and controls and institutional alternatives to be considered for adoption and application by all levels of government in those circumstances, if any, where additional growth may be permitted in the Bay area.
5. Based on 1 - 4 above, prepare a comprehensive land use and environmental management plan for the Bay area, which plan shall address the concerns about the impact of further development in the Bay area and include recommendations for appropriate action by the Legislature, the Department, other State agencies, Ocean County, and Bay area municipalities.

This report is the third part of a three part study of the Barnegat Bay. The first part of the study, the Profile of the Barnegat Bay (Appendix 2), was a characterization of conditions and trends in Bay water quality, ecosystem vitality, and human activities that rely on or affect the Bay. The second part of the study, Management Recommendations for the Barnegat Bay (Appendix 3), was an assessment of alternatives for managing the Bay based on the results of the Profile and on issues of importance to the public. This third element of the planning process, a land use and environmental management plan for the Bay defines a multi-objective management approach directed at achieving meaningful and measurable improvement to the quality of life and resources in the Bay area. This is intended to be a non-regulatory approach; the purpose is to provide a guide plan which will raise the level of public debate by raising people's awareness of the management options available to them.

PRESENT CONDITIONS AND TRENDS

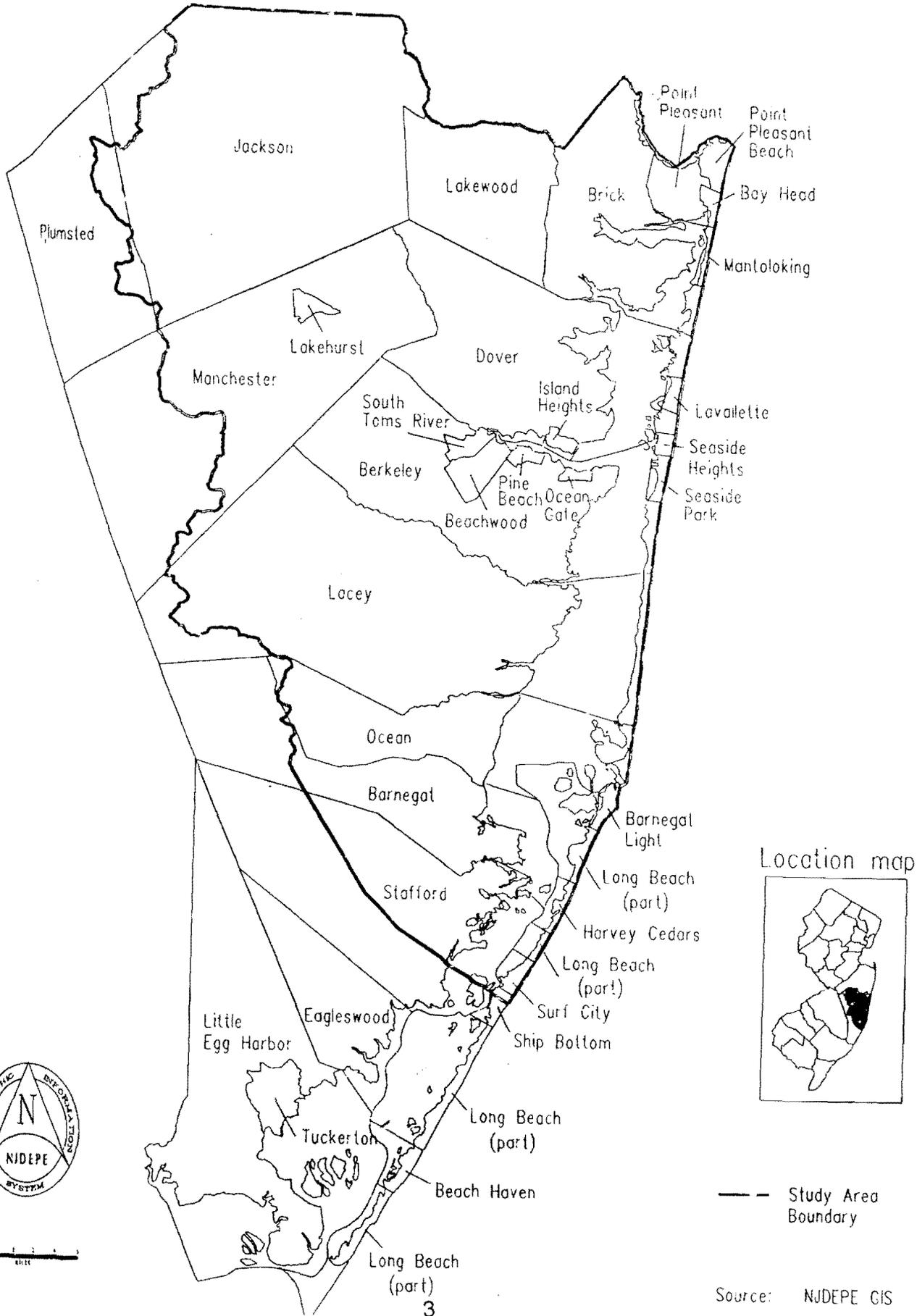
The Profile of the Barnegat Bay provided a detailed characterization of the physical environment and biological productivity of the Bay. The following data is a synopsis of that information.

Geography

The Barnegat Bay watershed lies in the coastal plain of New Jersey with topography gently sloping down to the estuary. The Bay itself is relatively long and narrow, lying between the mainland and a system of barrier islands. The water ranges in depth from less than 1 foot deep to about 13 feet deep.

For ease in planning and because relatively little of the watershed lies within Monmouth County, the Ocean County limit has been chosen as the northern boundary of the study area. New Jersey Route 72 was chosen as the southern boundary because it is considered by many to define the geographical difference between Barnegat Bay and Little Egg Harbor. Hence, the study area for the Watershed Management Plan for Barnegat Bay includes all or portions of 29 of the 33 municipalities in Ocean County (see Figure 1). It is expected that many of the management recommendations provided in this plan can be applicable to other areas and that future planning and implementation efforts may call for expansion of the defined study area.

FIGURE 1 Barnegat Bay Study Area



Population and Employment

The population of Ocean County has continued to grow each decade since the County's formation in 1850. Ocean County grew by 137,568 people between 1970 and 1980. An additional 87,165 people were added between 1980 and 1990. The 1990 population was 433,203, an increase of 224,733 people from its 1970 population. Population growth is expected to slow during the next two decades. Rutgers University Center for Urban Policy Research projections expect an increase of nearly 134,000 people by the year 2010. Ocean County Planning Board, as part of the State Development and Redevelopment Plan negotiations, projected growth of nearly 127,000 additional residents. Although this increase is smaller than the growth of the previous two decades, it does represent a 30% increase in the population of Ocean County in the next 20 years. Since 1950 Ocean County has had the greatest population growth in New Jersey and it is estimated that it will continue this trend.

Table 1
OCEAN COUNTY POPULATION

<u>Year</u>	<u>Population</u>	<u>% Change</u>
1950	56,622*	-----
1960	108,241*	+91%
1970	208,470*	+95%
1980	346,038*	+66%
1990	433,203*	+25%
2000	502,833**	+16%
2010	575,069**	+14%

* Ocean County Planning Board

** Rutgers University Center for Urban Policy Research

Available employment data indicates a similar growth pattern. Ocean County employment grew by 38,000 workers between 1980 and 1990, from 77,300 to 115,300. This represents a 49% increase in the employment base. The sectors experiencing the largest gains were services, finance, insurance and real estate, and wholesale trade. With continued growth in these sectors, projections to the year 2000 show an addition of 32,600 employees.

Existing Land Use

In terms of land use, the watershed can be characterized as consisting of four different subareas, all of which have residential uses as the primary type of development. The first area, the barrier islands, is very heavily developed with the exception of Island Beach State Park. The northeastern mainland portion of the study area, from Toms River northward, is heavily developed and has relatively little dedicated public open space. The southeastern section is currently less built up, with development mostly occurring along the Route 9 corridor. Much of the vacant area is environmentally sensitive and/or comprised of the Barnegat National Wildlife Refuge or the Manahawkin Fish and Wildlife Management Area. Much of the western side of the watershed has very low density development and is protected from extensive growth by the Pinelands Comprehensive Management Plan. There are also large tracts of dedicated public open space in this area.

Water Quality

Water quality in the Bay is being degraded by nonpoint sources of pollution. It is expected that the primary cause of this pollution is development on land and the activities associated with development (e.g., vehicle use, lawn and garden maintenance, septic systems), although other sources, such as boats and wildlife populations, are contributors to the pollution problem.

Current conditions in the Bay appear to reflect excessive nutrient inputs, resulting in high levels of phytoplankton growth and turbidity. These conditions in turn can upset the natural balance of the Bay ecosystem, although there is insufficient information available to determine whether impacts to populations are occurring. Coliform pollution is also evident in the Bay, as indicated by water quality monitoring and shellfish bed restrictions. Coliform pollution has resulted in direct impairment of human use of the Bay by resulting in restrictions on swimming and shellfish harvesting. Although metals contamination has been found in the sediments of some portions of the Bay, the extent of this and other forms of pollution is not known due to limitations in the amount of monitoring data available.

In general, development in the Barnegat Bay watershed has led to degradation of the Bay and its resources. All factors being equal, it is clear that more development will lead to more degradation. Approximately 34,000 dwelling units were built in the study area between 1972 and 1986. At least 65,000 additional units can be accommodated based on current zoning and development constraints such as wetlands and floodplains. In fact, the rate of degradation is likely to exceed the rate of development, given the pattern of low-density, segregated-use development that current zoning in the watershed encourages. The following tables demonstrate the general trend of population growth, housing demands and possible related pollutants running off into the Barnegat Bay area's waters. Although the extent of the watershed includes most of Ocean County and, therefore, statistics for the County as a whole are generally applicable, population figures have been further broken down to more closely represent the watershed. However, the following population estimates and projections include the entirety of any municipality which lies partially in the watershed (i.e., 29 of the 33 municipalities in Ocean County), while the pollutant loadings are presented for the watershed exclusively. It is unknown what the exact relationship is between the population and dwelling-unit projections and the zoned capacity of the watershed, but the tables serve to demonstrate the growth of the watershed and what pollutant loadings we are at least approaching. (See Appendix 4 for details.)

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Table 2

POPULATION ESTIMATES AND PROJECTIONS AND ASSOCIATED HOUSING REQUIREMENTS

<u>Year</u>	<u>Population</u>	<u># Dwelling Units Required</u>
1972*	226,265	87,025
1986*	396,664	152,563
1990**	413,871	160,745
1995**	448,975	177,356
2010**	548,132	224,815

* Ocean County Planning Board

** Rutgers University Center for Urban Policy Research

Table 3

TRENDS: IMPERVIOUS COVER & ASSOCIATED POLLUTANTS

<u>Year</u>	<u>Total P</u>	<u>Pollutant Export - lbs/year*</u>			
		<u>Total N</u>	<u>BOD 5-day</u>	<u>Extractable</u>	
				<u>Zn</u>	<u>Pb</u>
1972	16,779	128,742	329,178	2,428	1,216
1986	32,123	229,816	583,269	4,572	2,359
Zoning	72,939	561,571	1,430,970	10,389	5,304

* Schueler, 1987 and Cahill, 1992

PROBLEMS PRESENTED BY THE TRENDS

The problems found in the Barnegat Bay watershed reflect the unique character of the area and offer an excellent opportunity for addressing these issues, though they are not found exclusively in that region. The issues are, rather, representative of universal problems related to humankind's living on the earth. They are issues of continued population growth and economic development. They are issues surrounding how we choose to develop and use the land and water. All result from an increasing number of people living in and visiting the watershed and creating a demand for more houses, shops, offices, roads, recreation areas, sewage and trash disposal, and other goods and services. These land requirements then consume open space, create negative impacts on environmentally sensitive areas and limit the land available for public access.

The impacts of development result not only from the amount required, but also from its form and function. Much of the bayshore portion of the Barnegat Bay watershed consists of very densely built residential areas. Other portions of the watershed are less densely populated and are more representative of a typical American suburban or rural setting. Both of these patterns of development involve the separation of residences from workplaces and services. Thus, the existing form of development calls for extensive use of

automobiles and, hence, large paved areas for roads and parking. Rainfall then picks up the automobile-generated contaminants on the roadway, runs off of the impervious surface and often finds its way into the watercourses leading to the Bay.

The function of, or standards related to, development is also important in the equation involving growth and environmental health. For example, a natural and critical buffer, filter and habitat is eradicated when native trees and vegetation are removed from shorelines. The streams, rivers and Bay are thus rendered more vulnerable to pollutants. This situation is often exacerbated by the planting of non-native species which may require significant quantities of fertilizers and pesticides to thrive. Public strategies to address the impacts of growth and development are imperative even if we are to just maintain the status quo.

As well as the above-mentioned land use related impacts, the continued growth and development of the watershed has proved to have significant effects on the use of the water area in the Bay. Increasingly large numbers of people are wanting to use the Bay for all forms of recreational as well as commercial uses. As a consequence, growing conflicts have developed between the users concerning individual rights on the Bay. Concerns have also been raised about the impact of certain types of water area use on the quality of life of those living at the water's edge and disputes have arisen over the effects of some vessels and activities on the natural environment. A comprehensive set of policies is called for to address these impacts of growth and development on the water area.

AN ALTERNATIVE VISION

The current rate at which environmental degradation accompanies growth need not represent destiny; proper use of management techniques can contribute to simultaneous economic and environmental vitality. Although our activities in the watershed are inevitably connected to environmental disturbance and degradation, we can affect the type of pollutants and the rate at which they are introduced by choosing appropriate practices. An alternative vision of the future can guide our activities.

Such an alternative vision may include all levels of government coordinating to promote efficient development patterns which require minimal use of private automobiles and maximize accessible common open space. Environmentally sensitive areas are protected while personal property rights are respected. All citizens have adequate access to the bayshore in order to enjoy fishing, picnicking, boating, etc. The swimmer, the fisherman and the casual boater alike enjoy the Bay with a sense of safety. The assimilative capacity of the Bay has been determined and development is carefully constructed to minimize its contribution to pollutant loading. All residents and visitors to the area are aware of the special qualities of the Barnegat Bay watershed ecosystem and how they can contribute to its health. Stewardship of the land and Bay has become a practice of each citizen. The health of the

environment and the quality of life have improved and all are pleased to live in, visit or locate a business in the area.

What are the next steps to realizing this vision?

STATEMENT OF GOALS

This multi-year three part study involved significant coordination and public participation with citizens who live, work and recreate in the Bay area. A citizens advisory board was formed (see List of Contributors) to identify the issues and objectives of most concern to the citizens of Barnegat Bay watershed and, thereby, define the focus of the plan. The goals and objectives obtained from this process are listed below:

Goal 1 Maintain Shoreline Open Space

- * Identify and protect significant waterfront habitats
- * Require development designs that minimize impacts to natural habitats and maintain wildlife corridors
- * Allow only water dependent uses at the water's edge
- * Cluster waterfront uses to minimize open space consumption.
- * Clustering should be permitted only if supported by existing infrastructure

Goal 2 Maintain and Enhance the Recreational Fishing, Waterfowl Hunting and Trapping and Commercial Fishing Potential of the Bay

- * Provide opportunities for shoreline access for the non-boating, fishing public at well planned intervals
- * Provide adequate infrastructure including parking facilities
- * Restore and maintain water quality at levels to sustain directly harvestable and consumable shellfish (bivalve) populations
- * Protect water's edge wetlands and submerged aquatic vegetation
- * Ensure that harvests do not exceed sustainable yields
- * Ensure that opportunities are provided for both recreational and commercial fishing

Goal 3 Provide Opportunities for Boating and Water Contact Sports

- * Provide adequate infrastructure at access points including parking facilities and pump out stations
- * Ensure that boat use does not exceed the carrying capacity of the Bay
- * Ensure that opportunities are provided for both motorboating and sailing
- * Ensure safe boating conditions
- * Ensure that boat use does not conflict with water contact sports

- * Minimize water quality impacts associated with boating
- * Ensure that water quality does not limit water contact sports

LAND USE MANAGEMENT TOOLS

Numerous laws, policies and programs exist at the federal, state, and local levels of government to protect estuarine habitats and to control land and water use. These include: the Federal Clean Water Act, State coastal zone management, wetlands and flood plain statutes, and local subdivision and site plan ordinances, to name a few. All of these have effective components and the efforts of agency personnel have resulted in important gains in land use management and habitat protection through the years. The Wetlands Act of 1970, for example, has been quite effective in eliminating the wholesale alteration of salt marshes. Nevertheless, incremental loss and degradation of wetlands and other coastal habitats continues, the result of numerous small scale coastal and upland development and polluting activities that fall through the regulatory net. The regulated public also often expresses concern about overlapping duties between State, County and local governments and the use of standards which are inconsistent among agencies. Lastly, a recurring concern of persons involved in the plan development process focussed on the need for additional regional authority to deal with regional and multi-municipality land use management problems.

One of the functions of this report is to address all three concerns by advancing a course of action that will both streamline the regulatory process and promote environmentally sensitive growth and development. After careful review of the existing institutional framework it is clear that there are several levels of opportunity for improved land use management as well as a broad array of available tools.

To achieve the goals articulated above, it is necessary to employ several land use management strategies. Over the short term there are many actions that can be taken to more efficiently and effectively utilize existing tools. Enhancement of these existing land use management tools (i.e., amending existing rules, plans and ordinances) has the potential to accomplish a great deal toward protecting the character and resources of the watershed. Longer term initiatives involve expanding the influences of government by creating new powers for controlling land and water use and changing individual behavior to recognize that stewardship of the land is everyone's responsibility.

Following is a list of a variety of the tools which can be used to assist in achieving a balance between natural systems and residential, commercial and industrial development. No one of these options will serve as a panacea and not all are equally appropriate for all municipalities, but each has the potential to function as an integral element of a comprehensive growth management scheme. A brief description and assessment of each method may be found in Appendix 5.

Zoning
Development Allocation
Siting/Timing of Utilities and Public Facilities
Cluster Development
Planned Unit Development
Incentive Zoning
Conservation Zoning
Impact Fees
Donation of Property
Transfer of Development Right
Transfer of Development Credits
Regional Tax Base Sharing
Public Fee Simple Acquisition
Land Banking
Development Criteria Point System/ Performance Zoning

STRUCTURE OF THE PLAN

For the most part, the watershed is located in Ocean County, New Jersey. From an institutional perspective this allows a management system that is not muddled by multi-State, or multi-County interests. Operating at the County level also provides the opportunity to do planning on a regional basis which can expand on the individual municipal perspective. At the same time, the goal of improving water quality to maintain and enhance aquatic systems, is one that cannot be realized by a few specific actions or even actions at one level of government. The study approach, therefore, capitalizes on these considerations and involves a broad array of actions spanning Municipal, County, State and Federal authority. Furthermore, an overt attempt to identify intergovernmental redundancies, environmental management loopholes, and opportunities to "bring government closer to the people" have been integrated into the plan design.

The watershed plan embodied in this report is organized into seven categories:

- Watershed Management (Chapter II)
- Sensitive Area Protection (Chapter III)
- Water Area and Use (Chapter IV)
- Fisheries Management (Chapter V)
- Public Access (Chapter VI)
- Public Participation and Education (Chapter VII)
- Research and Monitoring (Chapter VIII)

Each chapter is designed to function as a guide for action for that particular resource management issue. Each section consists of three elements: 1) A definition of the resource management problem; 2) An articulation of the major objectives for the subject resource management issue; and 3) A series of specific action plans crafted to meet a specific short or long term objective. Responsible parties and required resources and legislation are then listed for each action plan in order to facilitate implementation. A list of addresses for all identified agencies can be found in Appendix 6.

CHAPTER II: WATERSHED MANAGEMENT

A Watershed Approach

The environmental issues related to Barnegat Bay and the actions necessary to address them provide an opportunity to engage in watershed planning and management on a regional basis. Such an approach offers real advantages when compared to either the more parochial perspective of municipal planning or planning that usually occurs on the State level. The Barnegat Bay is surrounded by 29 municipal jurisdictions within Ocean County. The municipalities are also within the jurisdiction of the Ocean County Utilities Authority and the Ocean County Soil Conservation District. In addition, the vast majority of the area is within the purview of the New Jersey Pinelands Commission and/or the New Jersey Department of Environmental Protection and Energy, Environmental Regulation section. The land use, development and stormwater management policies, frequently left uncoordinated from jurisdiction to jurisdiction, eventually have considerable collective impacts on the water quality of the Bay.

The water draining into the Bay emanates from throughout the entire watershed, carrying impurities that the water picks up as it travels across the land to a topographically lower watercourse and eventually into the Bay. Therefore, effective protection of the Bay will require planning and management on a regional watershed basis. In some ways, the Act authorizing the Watershed Management Plan for Barnegat Bay (P.L. 1987, Chapter 397) anticipated a regional approach. The Act defined "bay area" as that area of Ocean County comprising Barnegat Bay and all lands within the Bay area municipalities located between Barnegat Bay and the first public road of the Bay area municipality. The expansion of the definition of the study area to include the whole watershed simply incorporates an increased ecological perspective.

Since the environmental issues in the watershed arise on a regional level and local jurisdictions adjacent to the Bay are not equipped on their own to address many of these concerns, a regional planning entity must be identified for the watershed. While the watershed area and Ocean County are not precisely coincidental, they match closely enough to have the County serve as a logical regional planning surrogate. Making use of the County in this way also avoids the introduction of yet another level of government administration to this picture. The municipalities in the Bay area will continue to have primary authority to establish land use policy that affects both the type and rate of development. However, Ocean County provides a convenient and effective political and administrative jurisdictional unit through which to plan and eventually manage the Bay as a valuable regional environmental resource. Bringing existing County authority to bear in a greater than local way as well as augmenting that authority will vastly improve the management of this resource.

State government also has an important role to play in this intergovernmental constellation. The most appropriate role for the State in

terms of the formulation and implementation of watershed-based policies is the provision of technical advice and financial support. This role will expand as municipal and county programs and regulatory activities expand. In this way, regional watershed planning and management will augment municipal control.

Other areas of the country have already set the stage and experienced success in regional watershed management planning. For instance, through federal programs, governmental agencies around Puget Sound and Chesapeake Bay have been able to coordinate their programs and develop integrated processes to manage environmental problems, such as nonpoint source pollution, and preserve significant sensitive resources. In both of these cases, planning has been done on an extralocal level, but municipal input has been integral to the decision-making process. Planners around Chesapeake Bay took a detailed look at the Bay's problems and the effects of growth and development on key resources, and then proposed means by which to direct future growth and protect the resources. Closer to New Jersey, both Delaware and New York have entered into similar regional planning processes for their estuaries. It is now time to follow a watershed-based approach in order to protect Barnegat Bay.

Nonpoint Source Strategy

As was noted above, the origins of nonpoint source pollution are quite diffuse, as is the manner in which it enters the water bodies of the drainage basin. Therefore, this water quality problem cannot be adequately controlled through a governmental permitting structure. The issue of appropriate management is further complicated by the fact that the flushing of contaminants into the water is closely associated to rainfall events and, hence, has widely varying quantity, frequency, and duration. These complexities inherent to nonpoint source pollution necessarily call for a multi-faceted management strategy. It is important to focus not only on technical solutions, but also on pollution prevention and public outreach, streamlined permitting, and administrative delegation to effective local jurisdictional units. It is also important to focus not only on new development and redevelopment, but also on nonpoint source pollution resulting from existing land uses.

Action Agenda

The action steps outlined in this chapter are organized by watershed management objective. There are five specific objectives as follows:

- 1) *Encourage existing planning and regulatory bodies to coordinate and further promote land use which is sensitive to the natural environment.*
- 2) Improve water quality of the Bay by reducing nonpoint source pollution from new and existing development, including nutrients, sediments, toxics and pathogens to a point at which the full biotic and recreational potential of the Bay is reached.

- 3) Promote development patterns, densities and management strategies which minimize the increase in stormwater runoff and associated pollutants.
- 4) Maintain shoreline open space.
- 5) Recommend development designs that minimize impacts to natural habitats and maintain wildlife corridors.

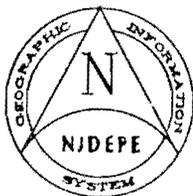
Watershed Boundaries

FIGURE 2



Unlabeled watersheds drain directly to Barnegat Bay

Source: NJDEPE GIS;
1:24,000 USGS quadrangle maps



Objective 1 Encourage existing planning and regulatory bodies to coordinate and further promote land use which is sensitive to the natural environment.

Action Plan #2.1A

Revise municipal master plans and amend development ordinances to encourage compact and efficient development patterns which will minimize negative impacts on the Barnegat Bay environment. The following should be included in this process:

- 1) Coordinate development, using timing and sequencing, to maximize the use of existing infrastructure and reduce sprawl.
- 2) Encourage clustering to reduce wasteful land consumption, maximize infrastructure, reduce impervious surfaces and stormwater runoff and lower development costs. (see also Action Plan #2.25)
- 3) Include all eleven elements as provided for in the Municipal Land Use Law. Incorporate concepts promulgated by the Interim State Development and Redevelopment Plan.

Action Plan #2.1B

Ocean County Planning Board should assist municipalities in the planning process by providing guidance and technical information. This assistance should include gathering, analyzing and disseminating information to municipalities. This information should be in tabular and mapped formats, ideally on a Geographic Information System (GIS), and include, but not be limited to:

- 1) Land development trends over time
- 2) Existing vacant developable land, and suitable redevelopment sites
- 3) Development as permitted by municipal zoning ordinances
- 4) The relationship of population projections to zoning allowances
- 5) Projected acres of residential impervious coverage

6) Quantification, as feasible, of the pollutant export associated with the projected residential impervious coverage (see Appendix 4)

Rationale

Municipalities are responsible for planning for growth and development as authorized by the New Jersey Municipal Land Use Law (MLUL) (N.J.S.A. 40:55D - 1 et seq.). Municipal master plans, however, do not as a rule contain the optional elements allowed by the MLUL. These optional elements would enhance the municipalities' ability to accommodate growth while protecting the natural environment of the Barnegat Bay watershed.

Since Ocean County encompasses the vast majority of the watershed, the Ocean County Planning Board is the logical coordinating agency and technical resource to assist municipalities in planning. Municipalities will need the above data as they reexamine existing plans and ordinances and make decisions about locating future development.

Lead Responsibility

Municipal planning boards and governing bodies to revise municipal master plans and zoning ordinances

Cooperating Parties

- 1) Ocean County Planning Board to offer technical assistance to municipalities for revising master plans and zoning ordinances
- 2) N.J. Office of State Planning to provide model ordinances and technical assistance
- 3) N.J. Department of Environmental Protection and Energy (DEPE) to offer training in GIS mapping and provide digital data where available

Resources

Pass-through funds (passed down from the federal government, through the state government to the local level) available under the Coastal Zone Management Act and the Clean Water Act should be considered for use for watershed management planning in the Barnegat Bay watershed.

Section 604(b) of the Clean Water Act provides for grants for conducting studies/projects pertaining to the development of a comprehensive regional nonpoint source pollution control and environmentally sensitive area management program. Regional public comprehensive planning organizations may apply for funding under this program.

In addition, under Section 309 of the Coastal Zone Management Act, New Jersey is participating in the new Coastal Zone Enhancement Grant Program which is

focusing on eight areas requiring program improvements and enhancements. One of these areas is Cumulative & Secondary Impacts. The State of New Jersey should seek funding under this new program for the Watershed Management Plan for Barnegat Bay as it relates to this enhancement area.

Appropriate funds available under these Acts should also be used for State in-house activities relevant to Barnegat Bay watershed management planning. For instance, DEFE should continue to use a portion of the funds it receives under Section 319 of the Clean Water Act to participate in Barnegat Bay-related nonpoint source planning activities.

**Required
Legislation**

Legislation is required to provide for timing and sequencing of development



**Action Plan
#2.2**

Strengthen the county enabling legislation and develop an interagency agreement in order to effect transference of the administrative requirements of the Coastal Area Facility Review Act (CAFRA) from the N.J. Department of Environmental Protection and Energy (DEPE) to the Ocean County Planning Board. (see also Action Plans #3.6, #4.15 and #4.18)

Rationale

The Ocean County Planning Board has a broad enough jurisdiction to be able to bring a regional perspective to planning and regulation within the vast majority of the Barnegat Bay watershed while also being focussed enough to know the local issues. It is therefore appropriate that, where feasible, the State delegate suitable authority. Transference of regulatory duties related to CAFRA would also assist in streamlining the development review process.

**Lead
Responsibility**

N.J. Legislature

**Cooperating
Parties**

- 1) DEPE
- 2) Ocean County Freeholders
- 3) Ocean County Planning Board

Resources

Expanded review powers of the Ocean County Planning Board will require additional dedication of staff time. This labor could be supported by fees charged to applicants.

**Required
Legislation**

Requires amendment to the County Planning Act (N.J.S.A. 40:27-1 et seq.) or new legislation specifically written for Ocean County

**Action Plan
#2.3A**

Adopt municipal ordinances which are consistent with applicable policies in the N.J. Department of Environmental Protection and Energy's (DEPE) Rules on Coastal Zone Management and consistent with this plan.

**Action Plan
#2.3B**

Develop a voluntary certification process whereby municipal ordinances and regulatory procedures regarding the above mentioned applicable policies are submitted for State approval. Once a municipality is certified, development proposals in that municipality would not have to undergo duplicative review (i.e. municipal, County or State) with regard to those specific policies. The certification process should include a periodic audit procedure which verifies that municipal ordinances remain consistent with State policy and that municipalities continue to retain qualified personnel to carry out development reviews and inspections.

Rationale

Adoption of these policies would increase interagency consistency in development review and would decrease the environmental impact of development proposals not regulated under the Coastal Area Facility Review Act. Such policies include, but are not limited to:

- Barrier Island Corridor
- Bay Islands
- Beaches
- Filled Water's Edge
- Existing Lagoon Edge
- Flood Hazard Area
- Erosion Hazard Areas
- Cranberry Bogs
- Wet Borrow Pit Margin
- Coastal Bluffs
- Intermittent Stream Corridors
- Endangered or Threatened Wildlife or Vegetation
Species Habitat
- Critical Wildlife Habitat
- Dunes

**Lead
Responsibility**

- 1) Municipal governing body to modify ordinances
- 2) DEPE to develop a certification process

**Cooperating
Parties**

- 1) Municipal planning boards
- 2) Municipal zoning boards of adjustment

Resources

Development application fees and escrow monies can be used to provide funding for municipal review. Delegation of the review process would avoid duplicative fees and review.

**Required
Legislation**

Municipal ordinances need to be introduced. The Municipal Land Use Law (Chapter 291, Laws of N.J. 1975) allows for this regulation in section 40:55D-65a. This section indicates that a zoning ordinance may "(l)imit and restrict building and structures to specified districts and regulate buildings and structures according to their type and the nature and extent of their use, and regulate the nature and extent of the use of land for trade, industry, residence, open space or other purposes".

**Action Plan
#2.4**

Adopt ordinances which establish environmental commissions in all municipalities.

Rationale

Environmental commissions can help municipalities in the land use decision making process by providing information on potential environmental impacts of proposed development such as water quality, open space protection, plant and animal habitats, etc. Environmental commissions can also serve as sources of information on state environmental laws and programs. In both of these roles, municipal environmental commissions can be integral in contributing to the healthy future of the Barnegat Bay watershed.

**Lead
Responsibility**

Municipal governing bodies

**Cooperating
Parties**

- 1) Association of New Jersey Environmental Commissions
- 2) Ocean County Soil Conservation District
- 3) Ocean County Environmental Agency

Resources

No significant financial resources required for establishment of environmental commissions.

**Required
Legislation**

May require new municipal zoning ordinances or revisions to existing ordinances (see Appendix 7 for enabling legislation and model ordinance)

**Action Plan
#2.5**

Recommend in municipal land use ordinances that all site plan and subdivision applications be reviewed prior to a public hearing by a committee consisting of members of both the planning and zoning boards, environmental commission, board of health, appropriate authorities and other relevant parties.

Rationale

As per the Municipal Land Use Law (Chapter 291, Laws of N.J. 1975) (MLUL) a development application can only go before the planning board or the zoning board of adjustment. Some variances can only be issued by the zoning board, therefore some development applications only appear before the zoning board for both a variance and site plan or subdivision review. Typically, the role of zoning boards is to focus on case-by-case issues, rather than have a more comprehensive planning approach. Therefore, it is appropriate for other parties to also have the opportunity to review a proposal. In addition, the recommended structure facilitates the flow of the formal portion of the review process. Design details can be worked out before a proposal is presented to the planning or zoning board and the board saves time because they are dealing with a complete application. The process can also reduce the cost of development as conceptual plans may be used to address preliminary design issues.

**Lead
Responsibility**

Municipal governing bodies

**Cooperating
Parties**

- 1) Municipal planning boards
- 2) Municipal zoning boards of adjustment
- 3) Environmental commissions
- 4) Municipal boards of health
- 5) Ocean County Soil Conservation District
- 6) Other appropriate entities

Resources

Fees will have to be paid for the services of professional consultants to the municipality. As is provided for in the example of an ordinance in Appendix 8, the applicant may be required to post escrow fees to cover these costs.

**Required
Legislation**

May require new municipal zoning ordinances or revisions to existing ordinances (see Appendix 8 for an example of an ordinance).

Creation of a Site Plan Review Advisory Board is provided for by the MLUL in Section 40:55D-39f. Concept plans may be similar to those referred to in Section 40:55D-10.1 of the MLUL.

**Action Plan
#2.6A**

Establish a Barnegat Bay Watershed Association which will conduct educational programs and otherwise function as an advocate for the Barnegat Bay Watershed. This could be done in conjunction with existing programs such as New Jersey Department of Environmental Protection and Energy Water Watch and Barnegat Bay Watch Monitoring Program. (see sample Watershed Association Bylaws in Appendix 9)

**Action Plan
#2.6B**

Develop an affiliated Bay Keeper Program to publicize findings of pollution data and violation data to decision-makers, public agencies and citizens groups. (see Appendix 10 for a brochure describing the Delaware River Keeper Program)

Rationale

A Watershed Association is a non-profit citizen's action organization made up of people who live where the problems are and who have the most to gain by solving these problems. Instead of having to limit its activities to a single municipality or just the Bay, a Watershed Association can function throughout the natural boundaries of the region draining into the Bay. A Watershed Association can act directly to educate the public in protecting resources and to promote better land use laws. It can encourage action by Municipal, County and State agencies. A Watershed Association is intimately familiar with the problems of its locality and can meet them with local leadership, understanding and initiative.

The major function of the Bay Keeper is to keep a watchful eye on the Bay for potential polluters and unchecked pollution. Part of the responsibilities of a Bay Keeper is to educate agencies, businesses and the general public about how to prevent pollution, to be an advocate for the Bay as a resource, to negotiate with agencies for more stringent pollution laws and enforcement and to initiate litigation when necessary. Such a person could act as a liaison to the Watershed Association as well as other environmental organizations and alert agencies and citizens about potential problems and give updates on the health and welfare of the Bay.

**Lead
Responsibility**

- 1) Interested citizens and organizations in conjunction with the Ocean County Environmental Agency to form the Watershed Association
- 2) Watershed Association to undertake a feasibility study towards the formation of a Bay Keeper program

**Cooperating
Parties**

- 1) Organizational assistance from the Mid-Atlantic Council of Watershed Associations
- 2) American Littoral Society, and other interested citizens and groups
- 3) N.J. Sea Grant (Barnegat Bay Watch Monitoring Program)

Resources

- 1) Private foundation grants
- 2) N.J. Department of Environmental Protection and Energy, Office of Environmental Services; Matching Grant Program
- 3) Membership fees and donations
- 4) Corporate contributions

**Required
Legislation**

None

**Action Plan
#2.7**

Pursue the use of Section 309 coastal zone enhancement funds under the Coastal Zone Management Act for implementation of priority action plans of the Watershed Management Plan for Barnegat Bay.

Rationale

Under Section 309 of the Coastal Zone Management Act, New Jersey is participating in the new Coastal Zone Enhancement Grant Program which is focussing on eight areas requiring program improvements and enhancements. One of these areas is Cumulative & Secondary Impacts, which is directly applicable to the Barnegat Bay watershed and the cumulative and secondary impacts of the growth which is occurring there.

**Lead
Responsibility**

N.J. Department of Environmental Protection and Energy

**Cooperating
Parties**

National Oceanic and Atmospheric Administration

Resources

The State of New Jersey is currently seeking funding under this new program for the Watershed Management Plan for Barnegat Bay as it relates to this enhancement area.

**Required
Legislation**

None

**Action Plan
#2.8**

Request participation in the National Estuary Program by nominating Barnegat Bay to the U.S. Environmental Protection Agency as an estuary of national significance and request a management conference be convened to continue the comprehensive planning process.

Rationale

The time frame (initially up to five years) and financial provisions of the National Estuary Program would allow a management conference to perform research and monitoring to address those areas where there is a lack of data on the Barnegat Bay ecosystem. In addition, a more in-depth planning process would be feasible and could expand on the recommendations of the Watershed Management Plan for Barnegat Bay.

**Lead
Responsibility**

The Governor of the State of New Jersey to nominate Barnegat Bay

**Cooperating
Parties**

- 1) U.S. Environmental Protection Agency (EPA)
- 2) N.J. Department of Environmental Protection and Energy
- 3) International, interstate or regional agencies or entities having jurisdiction over all or a significant part of the estuary
- 4) Each interested Federal agency, as determined appropriate by the Administrator of the EPA
- 5) Local governments having jurisdiction over any land or water within the estuarine zone, as determined appropriate by the Administrator
- 6) Affected industries, public and private educational institutions, and the general public, as determined appropriate by the Administrator

Resources

The Administrator of the EPA is authorized to make grants to State, interstate and regional water pollution control agencies, interstate agencies, other public or nonprofit agencies institutions, organizations and individuals. The purpose of these grants is to pay for assisting research, surveys, studies and modeling and other technical work necessary for the development of a conservation and management plan. Federal grants will provide up to 75% of the cost for the research and development of a management plan. The State must contribute the remaining 25% of the funding necessary for this study.

**Required
Legislation**

None

**Action Plan
#2.9**

Conduct a general reexamination of the Watershed Management Plan for Barnegat Bay at least every five years and prepare a report on the findings of such reexamination, a copy of which report shall be sent to the Ocean County Planning Board, the planning board of each municipality lying completely or partially within the study area as defined in the Watershed Management Plan for Barnegat Bay and the director of the Barnegat Bay Watershed Association, if existent.

The reexamination report should state:

- 1) The major problems and planning goals relating to the Barnegat Bay watershed at the time of the writing of the Watershed Management Plan for Barnegat Bay or the last reexamination report, whichever is more recent.**
- 2) What measures have been taken to address the identified problems and goals.**
- 3) The extent, where measurable, to which such problems and goals have been reduced or have increased subsequent to the writing of the Watershed Management Plan for Barnegat Bay or the last reexamination report, whichever is more recent.**
- 4) The extent to which there have been significant changes in the assumptions, goals and objectives forming the basis for the Watershed Management Plan for Barnegat Bay as last revised.**
- 5) The specific changes recommended for the Watershed Management Plan for Barnegat Bay, if any, including underlying goals and objectives, or whether a new plan should be prepared. If necessary, prepare said new plan.**

Rationale

Since the natural and human-created environments of the Barnegat Bay watershed are dynamic systems, it can be expected that significant changes may occur over time. A reexamination of the Watershed Management Plan for Barnegat Bay at five year intervals allows for assessment and incorporation of these alterations into the planning and implementation processes.

**Lead
Responsibility**

N.J. Department of Environmental Protection and Energy, or the equivalent State agency

Cooperating Parties

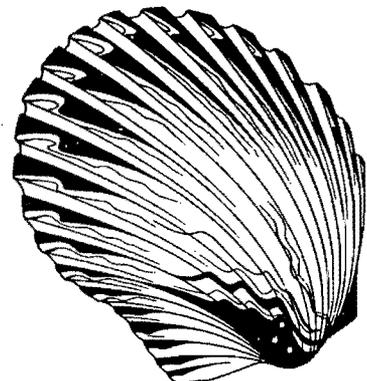
- 1) Ocean County Planning Board
- 2) Municipal planning boards
- 3) Barnegat Bay Watershed Association, if existent

Resources

The State should request that federal funds received under the Clean Water Act, the Coastal Zone Management Act and other relevant legislation be allocated to the review and revision of the Watershed Management Plan for Barnegat Bay.

Required Legislation

None



**Action Plan
#2.10**

Oversee the implementation of the Watershed Management Plan for Barnegat Bay. Duties should include, but not be limited to:

- 1) Encouraging all relevant parties to implement appropriate action plans**
- 2) Coordinating activities of implementing parties**
- 3) Seeking funding for implementation**
- 4) Serving as centralized manager of data**

Rationale

It is imperative for implementation of the Plan that one entity have responsibility for coordination. The Ocean County Planning Board is the appropriate party for this role because it is consistent with the focus of their mission to do regional planning for Ocean County. In addition, they are in the position of having a regional perspective but being locally situated and, hence, having an intimate knowledge of the area.

**Lead
Responsibility**

Ocean County Planning Board

**Cooperating
Parties**

- 1) Residents of the watershed**
- 2) Members of the Watershed Association, if existent**
- 3) N.J. Department of Environmental Protection and Energy**
- 4) Municipal governing bodies and planning boards**

Resources

A stable source of funding will be required to oversee adequate, continuous implementation of the Management Plan.

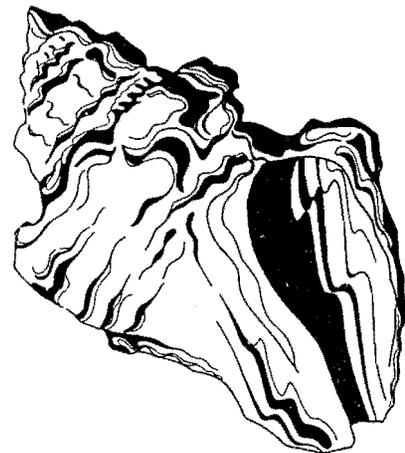
**Required
Legislation**

None

Objective 2	Improve water quality of the Bay by reducing nonpoint source pollution from new and existing development, including nutrients, sediments, toxics and pathogens to a point at which the full biotic and recreational potential of the Bay is reached.
Action Plan #2.11	Adopt municipal stormwater management plans and ordinances for new development in accordance with the rules (N.J.A.C. 7:8 <u>et seq.</u>) implementing the New Jersey Stormwater Management Act. Stormwater management policies and programs should be horizontally coordinated on the state level (e.g., Pinelands, Ocean County Soil Conservation District) and vertically coordinated with local plans to minimize inconsistencies and contradictions. (see also Action Plans #2.20 and #3.2)
Rationale	The Stormwater Management Act rules establish a program where the State provides municipalities with technical guidance to develop a stormwater management plan that is adopted into the municipal master plan. The plan, in turn, is implemented through a municipal ordinance and through the site plan and subdivision review process. Under this program, the plans and ordinances are reviewed and approved by Ocean County and the local Soil Conservation District. The adoption of the current model ordinance available from N.J. Department of Environmental Protection and Energy (DEPE) would establish minimum technical standards to address water quality impacts and flood control in each municipality throughout the area. Within the study area, Stafford Township has already adopted a stormwater management plan and ordinance in accordance with these rules that could be used as an example.
Lead Responsibility	<ol style="list-style-type: none"> 1) Municipal planning boards to develop plans 2) Municipal governing bodies for adoption of ordinances
Cooperating Parties	<ol style="list-style-type: none"> 1) DEPE 2) Ocean County Planning Board 3) Ocean County Soil Conservation District
Resources	Possible grants under the Stormwater Management Act, current availability of funds in question.

**Required
Legislation**

Adoption of municipal stormwater ordinances required



**Action Plan
#2.12**

Establish a program of demonstration projects to encourage and investigate innovative best management practices for stormwater quality in existing developed areas. Best management practices should be flexible and reference alternative approaches to allow for local conditions and site sensitivity.

Rationale

Current best management practices, such as detention basins, are primarily applicable to new development. In the Barnegat Bay study area, older stormwater systems are inadequate for water quality control and are not ready candidates for retrofitting with today's technology. Too often, the regulatory framework hampers opportunities to develop new technology or explore new management strategies. A program supporting the design and implementation of innovative, low-cost, long-term best management practices is needed. Municipalities should examine implementing stormwater management improvements when undertaking other projects which require roadbed disturbance that also exposes stormwater pipes (e.g., waterline installation).

**Lead
Responsibility**

N.J. Department of Environmental Protection and Energy to design and carry out projects

**Cooperating
Parties**

- 1) U.S. Environmental Protection Agency
- 2) N.J. Department of Transportation
- 3) Professional Planning and Engineering Associations
- 4) Municipal engineers
- 5) Ocean County Soil Conservation District

Resources

The program could be run through a system of research grants or construction loans; funding is required.

**Required
Legislation**

Legislation may be required to set up the program, establish funding and clarify administrative responsibilities.

**Action Plan
#2.13A**

Institute a regional watershed approach to stormwater facilities maintenance. Municipalities should cooperate to purchase and share necessary machinery to perform maintenance.

**Action Plan
#2.13B**

Alter stormwater management facilities or systems built for flood control to improve water quality. For example, reconstruct the outlet structure of a flood control detention basin to hold back the water quality design storm.

**Action Plan
#2.13C**

Establish and implement a program of inspection and maintenance of stormsewer systems. Actions should include street-sweeping and catch basin cleaning.

**Action Plan
#2.13D**

Institute a program of inspection and maintenance of stormwater facilities (e.g., detention basins) so these structures perform at maximum efficiency. Inspection programs should include those facilities which may be privately owned as part of a homeowner/condominium association. Municipalities should include a stable source of funding in their budgets for facilities maintenance.

Rationale

A regional approach to maintenance can reduce the cost of maintenance by sharing the costs of machinery and equipment. A watershed approach can ensure that regular cleaning and maintenance is undertaken throughout the region.

The stormwater systems in the Barnegat Bay study area were primarily designed for flood control. The outlet structure of flood control basins can relatively easily be altered to retain smaller storms for water quality control. Multi-chamber catch basins can replace traditional catch basins to capture sediment and oil. However, maintenance needs or alterations must be considered and met to ensure these facilities can be efficient and effective mechanisms in improving water quality of stormwater runoff.

Lack of maintenance and inspection is a significant cause for failure of stormwater management facilities such as detention, infiltration and retention basins. A maintenance manual for these facilities has been developed by Ocean County Planning Board and Killam Associates for the N.J. Department of Environmental Protection and Energy. This publication is available from the New Jersey Department of Environmental Protection and Energy (DEPE) (see bibliography). Street-sweeping and catch basin cleaning are already practices observed by most municipalities; however, implementation may be sporadic and insufficient to effect pollutant reduction. Uncleaned catch basins can be conducive habitats for bacteria. Guidance for proper scheduling and inspection should be provided by the DEPE and the N.J. Department of Transportation (DOT).

**Lead
Responsibility**

Owner of the system or facility, including DOT, county or municipal public works or road departments, and homeowner associations

**Cooperating
Parties**

For engineering advice:

- 1) DEPE, Office of Land and Water Planning
- 2) U.S. Department of Agriculture, Soil Conservation Service
- 3) DOT
- 4) Ocean County Soil Conservation District
- 5) N.J. Highway Authority
- 6) Mosquito control commissions

Resources

- 1) Combined Sewer Overflow and Stormwater Management Abatement Bond Act, loan administered under Municipal Sewage Treatment Trust Fund within the DEPE. Also DEPE's Clean Communities Street and Storm Drain grants may provide possible seed money. A long-term funding mechanism for public works and road departments is needed. DEPE & Federal grants could be shared to fund equipment purchased as part of a regional maintenance agreement.
- 2) Ocean County Health Department should explore the feasibility of requesting funding for these activities from DEPE under the County Environmental Health Act (N.J.S.A. 26:3A2-21 et seq.).

**Required
Legislation**

Although the \$50 million bond is significant, it is still insufficient to address both combined sewer overflows and stormwater system repairs. An increased appropriation or bond is needed.

**Action Plan
#2.14**

Develop and implement a training program on stormwater best management practices and implementing regulations for county and municipal officials and employees.

Rationale

A Nonpoint Source and Stormwater Control Best Management Practice Manual (Manual) is currently being developed by N.J. Department of Environmental Protection and Energy (DEPE). The Manual describes appropriate techniques to reduce nonpoint source pollution at the time of site development, at the source, and prior to delivery to a receiving water. Seminars focussing on this guidance document are part of its implementation strategy. Priority should be placed on reaching the audience within the Barnegat Bay study area. The Ocean County Planning and Engineering Departments have expertise on the maintenance needs of stormwater management facilities and can provide further assistance to municipalities.

**Lead
Responsibility**

DEPE, Office of Land and Water Planning

**Cooperating
Parties**

- 1) Ocean County Soil Conservation District
- 2) Ocean County Engineering Department
- 3) Ocean County Planning Board
- 4) Municipal engineers
- 5) Municipal planning boards
- 6) Municipal zoning boards

Resources

Funding may be required for training materials and space.

**Required
Legislation**

None

**Action Plan
#2.15**

Install native species landscaping to demonstrate water conservation, pesticides reduction and fertilizer reduction on public lands and common open spaces. Coordinate N.J. Pinelands Commission, N.J. Department of Environmental Protection and Energy (DEPE), and Soil Conservation District programs to ensure consistency among programs. Educational signs explaining the purpose of this source control technique should be included.

Rationale

Often, the adoption of new practices to protect the environment by local residents is hindered by disbelief that such techniques work and are relatively easy to implement. Demonstrating alternative landscaping on public property and common open spaces would provide a tangible example of a nonpoint source control best management practice to area residents and save money for the municipality in the long-term.

**Lead
Responsibility**

- 1) Municipal public works departments
- 2) Ocean County Building and Grounds and Parks Departments
- 3) Ocean County College, to expand arboretum
- 4) Homeowners associations

**Cooperating
Parties**

- 1) Rutgers Cooperative Extension of Ocean County
- 2) Municipal environmental commissions

Resources

DEPE's Environmental Commission grants for planning only (see Appendix 11)

**Required
Legislation**

None

**Action Plan
#2.16**

Amend the Pesticide Applicator Training Manuals to include a section on "Pesticide Use in Watershed Areas" which addresses categories 2 (Forest Pest Control), 6 (Right-of-Way Pest Control), 6A (Ornamental Pest Control) and 6B (Turf Pest Control). This would be similar to the way the Pesticide Applicator Training Manual for Category 6 has a paragraph on "Groundwater Protection" on page 1-2 and a section on "Hazards Outside the Right-of-Way" on page 2-3.

Rationale

To reinforce the importance of applying fewer chemicals in the watershed, all certified pesticide applicators should be made aware of the impact that their actions may have on this highly sensitive area. Including the suggested new section will insure that every certified pesticide applicator in the State will have been informed about the information related to the need to reduce or suspend excessive pesticide use in these areas.

**Lead
Responsibility**

- 1) N.J. Department of Environmental Protection and Energy, Pesticide Control Element to revise manuals
- 2) Rutgers Cooperative Extension, Cook College to print and distribute manuals

**Cooperating
Parties**

All New Jersey Certified Pesticide Applicators

Resources

Manuals are sold by Rutgers Cooperative Extension, so revisions are self-funded

**Required
Legislation**

None

**Action Plan
#2.17**

Amend existing municipal ordinances and construction codes to include provisions for water quality improvement while maintaining safety and durability of roads and other infrastructure.

Rationale

Requirements for municipal subdivision improvements are sometimes in conflict with water quality and flood control objectives. While recognizing the purpose for these improvements, small changes could be made to minimize water quality impacts. For example, many towns require curbs for residential development. Curbs act to convey pollutant-laden water directly and quickly into a stormwater system. In contrast, grassed swales along the road's edge slows the water, captures sediment and absorbs nutrients.

**Lead
Responsibility**

- 1) N.J. Department of Environmental Protection and Energy (DEPE) in cooperation with the N.J. Department of Community Affairs should develop model ordinances. Guidance should be taken from Model Subdivision and Site Plan Ordinance and Nonresidential Site Plan Model Ordinance, both by Rutgers University.
- 2) Municipal governing bodies should adopt model ordinances

**Cooperating
Parties**

- 1) Professional planners, engineers and builders associations
- 2) Municipal planning boards
- 3) Municipal zoning boards
- 4) N.J. Department of Transportation
- 5) N.J. Highway Authority
- 6) Ocean County Soil Conservation District

Resources

Section 319 (Nonpoint Source Pollution) of the Federal Clean Water Act provides funding for implementation of water quality improvement programs.

**Required
Legislation**

Legislation not required. Memorandum of Understanding needed between the DEPE and the N.J. Department of Community Affairs.

**Action Plan
#2.18**

Ensure effective regulation and implementation of soil erosion and sediment control for all construction activities.

Rationale

The Soil Conservation Districts have the authority and program to regulate construction activities through the Soil Erosion and Sediment Control Act of 1975 (N.J.S.A. 4:24-39 et seq.). Sediment is often a destructive pollutant smothering organisms and clouding the the water column. In addition, sediment is a natural vehicle to carry other pollutants to a receiving water. A successful program of sediment and erosion control has potential to significantly reduce pollutants entering Barnegat Bay.

**Lead
Responsibility**

N.J. Legislature

**Cooperating
Parties**

Ocean County Soil Conservation District

Resources

Funding for the Soil Conservation Districts has recently been cut. Past funding should be reinstated and expanded as the nonpoint source control program expands.

**Required
Legislation**

The Soil Conservation District currently has the authority to monitor all multi-family dwelling and disturbances over 5,000 sq.ft. The Soil Erosion and Sediment Control Act of 1975 (N.J.S.A. 4:24-39 et seq.) should be amended by the legislature to close the loophole exempting single family dwelling construction from Soil Conservation District regulation.

**Action Plan
#2.19**

Empower the Ocean County Planning Board to review all aspects of proposed development which will have extralocal or regional impact. Such authority should include the review of drainage, roads and other relevant design provisions. Drainage review should be in accordance with the goals and objectives of the Ocean County Water Quality Management Plan. The County decision should not be able to override a negative municipal vote. Applicable legislation could permit other counties to adopt this provision for comprehensive county review.

Rationale

The quality and quantity of nonpoint source runoff is affected by all development within the Barnegat Bay watershed and all functions together to have a cumulative impact on the Bay and associated water bodies. Therefore, drainage review should be done on a regional, as well as municipal, level. However, the municipalities should still be able to use their localized knowledge of the area to definitively oppose a proposal. Additionally, when the Department of Environmental Protection and Energy adopts a Best Management Practices manual for nonpoint source runoff, the recommended techniques could be adopted and implemented at the county and local levels, thereby limiting the need for extensive state review.

For similar reasons, regional, or County, review of development proposals is also appropriate for other design aspects which have extralocal impacts. This recommendation should not be interpreted as an infringement on municipal zoning and planning prerogatives.

**Lead
Responsibility**

N.J. Legislature

**Cooperating
Parties**

- 1) Ocean County Soil Conservation District
- 2) Ocean County Planning Board

Resources

Expanded review powers of the Ocean County Planning Board will require additional dedication of staff time. This labor could be supported by fees charged to applicants.

**Required
Legislation**

Requires amendment to the County Planning Act (N.J.S.A. 40:27-1 et seq.) or new legislation specifically written for Ocean County

**Action Plan
#2.20A**

Develop a Coastal Nonpoint Pollution Control Program as stipulated by the Coastal Zone Reauthorization Amendments of 1990. This Program will require municipalities to develop local stormwater management/nonpoint source control plans. (see also Action Plan #2.11)

**Action Plan
#2.20B**

Develop rules under the Sewage Infrastructure Improvement Act (SIIA) to implement municipal stormwater management/nonpoint source control programs at the local level.

Rationale

The Coastal Zone Reauthorization Amendments of 1990, amending the Coastal Zone Management Act, charge the New Jersey Department of Environmental Protection and Energy (DEPE) with developing a Coastal Nonpoint Pollution Control Program. Municipalities must take measures to control nonpoint source pollutants that are contaminating stormwater. These nonpoint source pollutants include: nutrients in fertilizers from suburban lawns, oil and grease from streets and bacterial contaminants from domestic animal waste. All of these pollutants when washed into surface waters during a rain event can cause adverse impacts on water quality, and therefore, must be controlled.

The SIIA requires municipalities to implement nonpoint source control programs at a local level.

**Lead
Responsibility**

DEPE, Office of Land and Water Planning

**Cooperating
Parties**

- 1) The N.J. Pinelands Commission
- 2) Ocean County Planning Board
- 3) Municipalities in Barnegat Bay watershed
- 4) Ocean County Soil Conservation District

Resources

There is \$2.8 million available under the Sewage Infrastructure Improvement Act to provide grants to municipalities to develop stormwater management/nonpoint source control plans. These programs will address stormwater associated pollution concerns from new and existing development, as well as from such potential pollution sources such as solid and hazardous waste facilities. Included in these programs will be requirements for routine maintenance of the stormwater sewer system

and options for financing stormwater management/nonpoint source control.

**Required
Legislation**

None



**Action Plan
#2.21**

Complete Phase II of the requirements under the Sewage Infrastructure Improvement Act. In Phase II municipalities will be mapping their stormwater sewer system, monitoring stormwater discharges and investigating the system to locate the sources of contamination. Municipalities that are not involved in the Sewage Infrastructure Improvement Act should be performing similar work. Once the source of contamination is located, municipalities should take steps to eliminate the problem.

Rationale

The Cooperative Coastal Monitoring Program has identified areas in the Barnegat Bay that have exceeded water quality standards for bacteria. Many of these problems have been correlated to rainfall events. In 1988, for example, 14% of the samples collected in Ocean County exceeded the water quality standards for bacteria. Of these samples, 84% were collected after a rain event. From these data, it is evident that contaminated stormwater is causing water quality problems. In order to correct these problems the source of the contamination must be located and corrected. Phase II of the Sewage Infrastructure Improvement Act is designed to address these problems by requiring municipalities to monitor the stormwater discharges and investigate the systems to locate problems. Municipalities not involved in the Sewage Infrastructure Improvement Act should be performing similar work to identify concerns. If the source of the contamination is not found and corrected, contaminated stormwater discharges will continue to cause water quality problems.

**Lead
Responsibility**

N.J. Department of Environmental Protection and Energy,
Office of Land and Water Planning

**Cooperating
Parties**

- 1) Ocean County Board of Chosen Freeholders
- 2) Municipalities in the Barnegat Bay watershed

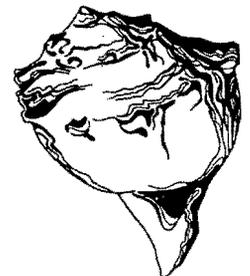
Resources

There is \$5.5 million available under the Sewage Infrastructure Improvement Act to provide grants to municipalities to perform mapping and monitoring. There is an additional \$4.7 million available under the Act for planning and design work to eliminate interconnections and cross-connections. However, these amounts are insufficient to ensure this work is performed. Municipalities should look towards the Stormwater Management and

Combined Sewer Overflow Abatement Bond Act , which provides \$50 million in the form of grants and loans to fund stormwater management and combined sewer overflow abatement projects.

**Required
Legislation**

None



**Action Plan
#2.22**

Develop a State stormwater permitting program for municipal stormwater systems. This permit would be a system-wide permit and would include new systems, best management practices, retrofitting, repairs and maintenance of a stormwater system.

Rationale

The U.S. Environmental Protection Agency (EPA) has developed regulations for permitting stormwater systems in large and medium municipalities and is in the process of conducting studies in order to determine what other types of stormwater permits will be issued for municipal systems. New Jersey currently has a Pollutant Discharge Elimination System permit program authorized by the EPA and has the authority to develop and implement a municipal stormwater permitting system.

**Lead
Responsibility**

N.J. Department of Environmental Protection and Energy (DEPE), Office of Land and Water Planning

**Cooperating
Parties**

- 1) U.S. Environmental Protection Agency
- 2) Municipalities in the Barnegat Bay watershed
- 3) Ocean County Planning Board
- 4) Ocean County Soil Conservation District

Resources

The DEPE has the necessary individuals to develop a municipal stormwater permitting program.

**Required
Legislation**

None

**Action Plan
#2.23**

Plan, construct and maintain sewer infrastructure in a manner that recognizes and protects sensitive natural resources from secondary impacts of installing infrastructure and the development that it may support or induce. Create more compact development patterns, in appropriate locations, to take advantage of existing sewer infrastructure within the watershed.

Rationale

The Barnegat Bay watershed, with the exception of the western, less densely zoned areas, is designated as sewer service area in the Ocean County Water Quality Management Plan. However, collection systems have not been constructed in all areas; existing and future development in these areas must rely on septic systems. Septic systems are a documented source of nutrients and coliform bacteria released to groundwater and ultimately to the Bay. These pollution sources would be eliminated by the provision of sewer service. Municipalities should be encouraged to plan sewer infrastructure and sewer service to development in the watershed to alleviate septic damage placed on areas adjacent to waterbodies and areas with known septic failures. Sewer infrastructure planned to eliminate failing septic systems in areas of environmental sensitivity should be of limited capacity to avoid attracting additional development which could cause further environmental damage.

**Lead
Responsibility**

- 1) Ocean County Utilities Authority
- 2) Ocean County Planning Board

**Cooperating
Parties**

- 1) Municipal planning boards
- 2) N.J. Office of State Planning
- 3) N.J. Department of Environmental Protection and Energy,
Office of Land and Water Planning
- 4) Municipal utility authorities

Resources

New Jersey Wastewater Treatment Trust administers a State revolving loan fund for municipal wastewater treatment and conveyance systems.

**Required
Legislation**

None

**Action Plan
#2.24**

Establish and implement a program of required septic system maintenance and inspection for new and existing systems. A public education program should be the first stage of this program and be implemented as soon as possible.

Rationale

The presence of excessive nutrients and coliform bacteria can cause environmental and human health problems in the Bay. Septic systems serve as a source of these pollutants even when they are functioning correctly; failure of these systems compounds the problem. Failure of septic systems is generally a result of improper construction and/or improper maintenance and siting. Where sewer service is available, every effort should be made to sewer existing and future development in accordance with the applicable Water Quality Management Plan. Where sewers cannot be made available, efforts must be made to minimize the contribution of septic systems to the nutrient and bacterial loadings of the Bay. There are presently, under N.J.A.C. 7:9A, requirements to ensure the proper design and construction of new and altered systems. A management program is not in place to address the problem of operation, maintenance and inspection of existing systems. The establishment of such a management program should be pursued and other mechanisms should also be explored. An immediate step which should be taken is a public education program.

**Lead
Responsibility**

N.J. Department of Environmental Protection and Energy (DEPE), Wastewater Facilities Management Element

**Cooperating
Parties**

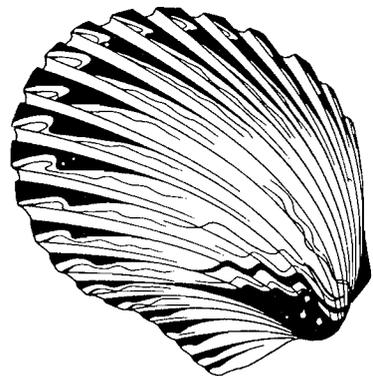
- 1) Ocean County Health Department
- 2) Municipalities
- 3) Homeowners
- 4) Rutgers Cooperative Extension of Ocean County
- 5) Ocean County Soil Conservation District

Resources

The Sussex County Septic System Management Demonstration Program, funded by DEPE, has produced several documents including a "Homeowner's Operation & Maintenance Manual". The DEPE has produced a "Homeowner's Manual for Septic Systems". Documents such as these should be looked to as models.

**Required
Legislation**

None



Objective 3	Promote development patterns, densities and management strategies which minimize the increase in stormwater runoff and associated pollutants.
Action Plan #2.25	Include cluster development in municipal zoning ordinances as a means of reducing impervious surfaces while providing buffers adjacent to sensitive areas. Planning boards should encourage it where supported by existing infrastructure.
Rationale	Altering the pattern of development is one way to reduce the amount of pollution generated by development. Although low density development has less impervious coverage on a per acre basis, the pollutant loadings from low density development are higher when considered on a per capita basis. When low density development relies on septic systems, nitrogen loadings will be higher still.
Lead Responsibility	<ol style="list-style-type: none"> 1) Municipal planning boards should encourage cluster development in site plan applications and negotiations 2) Municipal governing bodies should incorporate provisions for clustering into land use ordinances
Cooperating Parties	<p>Technical assistance to municipal planning boards and governing bodies should be provided by:</p> <ol style="list-style-type: none"> 1) N.J. Office of State Planning 2) Ocean County Planning Department
Resources	<p>No significant financial resources required.</p> <p>See Appendix 12 for <u>Guidelines on "Clustering". A Pattern of Settlement</u> by Rutgers Cooperative Extension Service. Also, refer to <u>Reclaiming the American Dream: Process and Principles for Planning and Designing Communities of Place</u> by Anton Nelessen, Professor, Rutgers University, Edward J. Bloustein School of Planning and Policy.</p>
Required Legislation	May require new municipal zoning ordinances or revisions to existing ordinances

**Action Plan
#2.26**

Establish minimum buffers adjacent to coastal wetlands

Rationale

Buffers preserve wildlife habitat and open space and serve as a pollutant control zone to reduce the impacts of development upon wetlands and wetlands species. They also provide temporary refuge for wetlands fauna during high water episodes, critical habitat for animals dependent upon but not resident in wetlands, and allow for slight variations of wetland boundaries over time due to hydrologic or climatologic effects.

**Lead
Responsibility**

- 1) N.J. Legislature to amend the Wetlands Act of 1970 (N.J.S.A. 13:9A-1 et seq.)
- 2) Municipal governing bodies to adopt protective ordinances

**Cooperating
Parties**

N.J. Department of Environmental Protection and Energy

Resources

No significant financial resources required.

**Required
Legislation**

Requires amendment to the Wetlands Act of 1970 (N.J.S.A. 13:9A-1 et seq.) or municipal ordinances need to be introduced.

Amendment of the Wetlands Act of 1970 to establish minimum buffers adjacent to coastal wetlands will serve to minimize the impacts of human activities on the wetlands regulated by the DEPE. Alternatively, adoption of municipal ordinances which establish minimum buffers adjacent to coastal wetlands will serve the same purposes as above and will minimize the impacts of human activities on the wetlands not currently regulated by the DEPE (development which falls below the threshold of the Coastal Area Facility Review Act and outside the wetlands boundary mapped under the Wetlands Act of 1970).

In addition, development of setbacks from the waters edge to maintain shoreline open space and habitat protection may require new municipal zoning ordinances or revisions to existing ordinances.

**Action Plan
#2.27**

For developed areas:

- A) Create critical zones no less than 150 feet in width along the Bay and other water bodies.**
- B) Critical zones shall be landscaped with low-maintenance, non-exotic, native species.**
- C) Within the critical zone the following activities should be prohibited:**
 - 1) Use of fertilizers & pesticides**
 - 2) Release of animal & other wastes**
 - 3) Construction or use of impervious surfaces**
 - 4) Storage of waste & toxic material**
 - 5) Storage of motor vehicles**

Rationale

Creation of this type of buffer for existing development is a means for minimizing the degradation of water quality and can complement broader community stormwater management. The use of native species should limit the need for application of pesticides and fertilizers and, hence, the potential for runoff of these chemicals into Barnegat Bay. Reference the plant list at Appendix 13.

**Lead
Responsibility**

Municipal governments to amend zoning ordinances

**Cooperating
Parties**

- 1) Ocean County Environmental Agency to draft model ordinances
- 2) Property owners to modify behavior and comply with ordinances

Resources

No significant financial resources required

**Required
Legislation**

Municipal ordinances need to be adopted

**Action Plan
#2.28**

Establish incentive programs, such as conservation easements and re-evaluation of real estate assessments on such easements to entice property owners and real estate developers to create buffer areas consisting of indigenous vegetation to protect wetlands and surface waters.

Rationale

Creation of a voluntary program for establishing buffers, where feasible, in existing development and new projects is a positive step in minimizing the degradation of water quality due to human activities. A conservation easement will ensure formal protection against loss of buffers while providing financial relief and incentive to the property owner for the diminished use of their property.

**Lead
Responsibility**

Municipal planning boards should initiate studying the feasibility of incentive programs such as conservation easements.

**Cooperating
Parties**

- 1) Municipal governments should encourage incentive programs where appropriate.
- 2) Technical assistance for model conservation easement language may be required from Association of New Jersey Environmental Commissions and the Natural Lands Trust.

Resources

No resources required to implement. The creation of easements may result in a diminution of property assessments and a slight reduction of real estate taxes.

**Required
Legislation**

None

Objective 4 **Maintain shoreline open space.**

**Action Plan
#2.29**

Create a stable funding source for the purpose of acquiring open space and achieving beach stabilization. Ocean County should place a referendum on the ballot to allow the tax payers to recommend an addition to the property tax (e.g., 1-3 cents) for such a fund (see Appendix 14 for copies of Monmouth, Atlantic and Cape May Counties' referenda.). Acquisition and stabilization along bayfront shorelines should be made a priority.

Rationale

Public acquisition of land is one effective means of directly maintaining shoreline open space. Public agencies are also responsible for beach stabilization. However, a stable funding source is needed to be able to do both of these projects. An addition to the property tax would provide such monies.

**Lead
Responsibility**

Ocean County Board of Chosen Freeholders to place the referendum on the ballot

**Cooperating
Parties**

Ocean County Environmental Agency to educate citizens about this proposal.

Resources

No significant financial resources are required to place the referendum on the ballot. If successful, this referendum would provide a stable source of funding for open space acquisition.

Estimated open space needs by population are identified in the Statewide Comprehensive Outdoor Recreation Plan produced by N.J. Department of Environmental Protection and Energy, Green Acres Program.

**Required
Legislation**

None

**Action Plan
#2.30**

Acquire sites fronting on open water bodies appropriate for open space, using Federal, State and private funds. Representative upland & wetland complexes which are suitable include, but are not limited to:

- Goodluck Point**
- Cedar Creek Point**
- Stout's Creek/ Murray Grove**
- North Side Forked River**
- Oyster Creek**
- Lighthouse Camp**
- Double Creek**
- Undeveloped Bay islands**

Rationale

Acquisition of land by governmental bodies is one effective means of directly maintaining shoreline open space. These areas represent the remaining undeveloped areas adjacent to or in the Bay and have been identified by the U.S. Fish and Wildlife Service for addition to the Forsythe Refuge.

**Lead
Responsibility**

N.J. Department of Environmental Protection and Energy

**Cooperating
Parties**

- 1) U.S. Fish and Wildlife Service
- 2) Green Acres Administration
- 3) Ocean County Board of Chosen Freeholders
- 4) Ocean County Environmental Agency
- 5) Municipal governing bodies and environmental commissions
- 6) Non-profit environmental organizations

Resources

- 1) U.S. Fish and Wildlife Service, Division of Ecological Services
- 2) Green Acres Bond funds
- 3) Private foundation grants

**Required
Legislation**

None

**Action Plan
#2.31**

Restrict development density and height at the water's edge in already developed areas. Revise municipal ordinances and municipal master plans accordingly.

Rationale

Most of the development surrounding Barnegat Bay and its tributaries is composed of low-rise single family residential units or marine commercial. The scale of existing development and open character of the Bay provide a perception of open space. Therefore, in order to maintain the sense of open space in developed areas the scale of development needs to be restricted.

**Lead
Responsibility**

- 1) Municipal governing bodies to adopt municipal ordinances
- 2) Municipal planning boards to revise master plans

**Cooperating
Parties**

- Advisory role:
- 1) N.J. Department of Environmental Protection and Energy
 - 2) Ocean County Planning Board
 - 3) Citizen advisory groups
 - 4) Rutgers University Department of Urban Planning and Policy Development

Resources

No significant financial resources required

**Required
Legislation**

Municipal ordinances need to be introduced

**Action Plan
#2.32**

Encourage and promote maintenance of commercial water dependent uses in appropriate areas that provide water access and a sense of open space.

Rationale

Present open space in developed areas is provided by public ownership, scale of development and provisions for access provided by marine commercial uses. The nature of these marine commercial uses tends to provide large quantities of open space in the form of vehicle parking areas, boat storage areas etc. Therefore, to maintain open areas along the water, marine commercial uses must be maintained. It should be noted that the use of stormwater best management practices is especially important for these developments due to their proximity to the water.

**Lead
Responsibility**

- 1) Municipal governing bodies
- 2) Municipal planning boards and zoning boards

**Cooperating
Parties**

- Advisory role:
- 1) N.J. Department of Environmental Protection and Energy
 - 2) Ocean County Planning Board
 - 3) Rutgers University Department of Urban Planning and Policy Development

Resources

No significant financial resources required

**Required
Legislation**

May require new municipal zoning ordinances or revisions to existing ordinances

Objective 5	Recommend development designs that minimize impacts to natural habitats and maintain wildlife corridors.
Action Plan #2.33	Adopt municipal ordinances for tree protection.
Rationale	Minimizing the cutting of trees during site development helps limit increased surface drainage, sedimentation and soil erosion, decreased soil fertility and loss of wildlife habitat.
Lead Responsibility	Municipal governing bodies
Cooperating Parties	For guidance: 1) N.J. Department of Environmental Protection and Energy, Division of Parks & Forestry 2) Ocean County Shade Tree Commission 3) Municipal environmental commissions
Resources	No significant financial resources required
Required Legislation	May require new municipal ordinances or revisions to existing ordinances (see Appendix 15 for model ordinance)

**Action Plan
#2.34**

Develop and implement a River and Stream Corridor Protection Program. Establish a system of protected, connected, open space lands along rivers and streams to protect the natural integrity of waterways and adjacent lands.

Rationale

Maintaining natural vegetative cover along waterbodies can reduce erosion and sedimentation, provide wildlife habitats and travel paths, protect structures from flood damage, provide public open space and provide opportunities for access to a scenic natural resource. These corridors would also strengthen and supplement the N.J. Freshwater Wetlands Protection Act.

**Lead
Responsibility**

The N.J. Legislature to authorize waterway corridor protection

**Cooperating
Parties**

- 1) N.J. Department of Environmental Protection and Energy, Office of Land and Water Planning should develop regulations to provide waterway corridors.
- 2) Ocean County Environmental Agency
- 3) Municipal environmental commissions

Resources

None required

**Required
Legislation**

Legislation will be needed to authorize waterway corridor protection. The Massachusetts River Protection Act should be considered as a possible model for implementation (see Appendix 16).

**Action Plan
#2.35**

Increase the size of the enforcement staff at the N.J. Department of Environmental Protection and Energy (DEPE) so they can consistently and uniformly enforce regulations requiring buffers and preservation of vegetation under the Coastal Area Facility Review Act.

Rationale

The sections of the DEPE responsible for enforcement of environmental regulations are currently understaffed. Increasing the staffing of these offices and, hence, their enforcement abilities, would help assure the preservation of buffers and limit the cutting of on-site vegetation, thereby helping limit increased surface drainage, sedimentation and soil erosion, decreased soil fertility and loss of wildlife habitat and generally promote effectiveness in environmental protection.

**Lead
Responsibility**

- 1) N.J. Legislature
- 2) DEPE

**Cooperating
Parties**

Residents of the area can report questionable activities

Resources

Increasing the size of the enforcement staff of the DEPE will require the allocation of additional State funds to these offices. Fines collected for enforcement actions could be used to offset the added cost.

**Required
Legislation**

An amendment to R.S.12:7-23.6 is required to return fines to the law enforcement agencies rather than the General Fund of the State Treasury.

Chapter III: SENSITIVE AREAS PROTECTION

Introduction

The Barnegat Bay and its watershed is a complex network of habitats. These habitats support a wide variety of species on land and water and work together to regulate and maintain a healthy Bay environment. These habitats depend on clean water to thrive; they are sensitive to deteriorating water quality and the effects of increased development and human activity in the watershed. Activities may directly damage one habitat, and because habitats are interlinked, other areas suffer secondary damage. Below is a list of sensitive areas found in the Barnegat Bay Watershed. Descriptions of each may be found in the Glossary.

Bay Islands	Bay Beaches	Dunes
Hard Clam Depurating Relay Beds	Intertidal and Subtidal Shallows	Ponds and Lakes
Forests	Rivers and Estuaries	Shellfish Habitats
Submerged Aquatic Vegetation	Rare and Exemplary Communities	Coastal Wetlands
Freshwater Wetlands	Wetland Buffers	Furbearer Habitat
Endangered and Threatened Species Habitat	Intermittent Stream Corridors	Anadromous Fish Spawning Runs
Waterfowl Habitats	Colonial Waterbird Nesting Sites	

Buffer Protection

Buffers to wetlands and waterways are important pollution mitigation measures because not all nonpoint source pollution can be treated with structural best management practices. For example, forested buffers, a superb filter and regulator of the environment, established between development and the Bay and its waterways can improve water quality of runoff and protect important habitats as a result. Because rain does not immediately run off forested areas, sediments are filtered out before the runoff enters the Bay. However, forested areas require maintenance and protection to ensure they remain healthy and functional. In addition, bacteria, which thrives in leaf litter on the forest floor, is effective in removing nitrogen left over from lawn application of fertilizers. Grassed buffers also trap sediment and filter pollutant runoff from land. In addition to their water purification functions, these buffers

also harbor wildlife. Maintaining buffers along stream corridors is especially important as it provides paths connecting habitat areas.

Therefore, state freshwater wetlands laws should be reexamined, as existing statutory buffer requirements may be insufficient in width to permit the buffer to improve water quality. Buffers need to be maintained in a natural state. Buffers regulations currently restrict construction to prevent wetland damage, but do not regulate mowing or planting non-native vegetation, which can be equally damaging.

Habitat Protection

Saltwater wetlands are the food-rich marsh and tidal flats where crabs and young fish live and waterfowl feed. Tidal marshes provide protection against erosion by absorbing wave energy, stabilizing sediment and absorbing excess runoff. This area is better known to modern human as waterfront real estate. The competition between nature, marinas and homeowners has been intense.

Non-tidal wetlands are home to a number of the Bay region's rare plant and animal species unable to exist outside of these wet habitats. Direct destruction through filling, draining or paving has been slowed due to statutory protection. Nevertheless, wetlands can be damaged indirectly by sedimentary overload generated by poorly managed construction sites. Seasonal recreational activities have also caused unintentional damage to the resources of the Bay as curious boaters and hikers intrude into nesting areas, damaging dune plants and frightening birds intolerant of human interference.

In addition, upland habitats are disappearing due to development and related activities. The spread of suburbanization claims forests throughout the watershed. As forests disappear, so do habitat opportunities for birds and other wildlife, including rare and exemplary vegetative communities, which contribute to the diversity of the watershed.

Vegetation Protection

The Barnegat Bay is shallow, a characteristic which allows sunlight to penetrate the Bay's waters. Light supports the vast underwater beds of grass. Submerged aquatic vegetation (SAV) beds are food for ducks and geese and indirect food sources for egrets and herons that feed on crabs and fish that inhabit the SAV beds. SAV beds clear the Bay's water by trapping and filtering tremendous loads of sediment, thereby clarifying water for better growing conditions. SAV beds are susceptible to propeller damage when boaters stray from navigation channels across shallow Bay areas.

Water Quality Protection

Development results in increased amounts of impervious surfaces and lawn areas within the watershed, as well as increased stormwater runoff. Stormwater is a major vehicle for pollution to be introduced to waterbodies. In recent decades, as development in the Barnegat Bay watershed has surged, runoff from developed land has included a more potent and harmful range of chemicals. For instance, pesticides and fertilizers are washed from suburban lawns. Petrochemical residue and toxic chemical residue from automobiles collect on impervious surfaces, waiting to be washed into the nearest stormwater facilities and eventually into the Bay.

Nitrogen and phosphorus occur naturally in soil. Small amounts of these elements naturally erode into waterways and are deposited into the Bay where they fertilize much of the Bay's phytoplankton and nourish the Bay's SAV beds. Currently the Bay is being overloaded with nutrients from fertilizers washed from lawns. This can cause the production of too much phytoplankton which can cloud the water, which diminishes light for underwater grasses.

Sediments are a source of nutrients and building materials for marshes, and small amounts of sediment are healthy for the Bay. But the increased sediment entering the Bay can be deadly as it smothers the eggs of spawning fish, damages gills of fish and contributes to the clouding of waters.

Excessive stormwater causes severe physical degradation of smaller waterways. Rain, which used to soak into soil, is now collected from impervious surfaces, channeled into gutters and is drained into streams. Rain also runs overland in what is called "overland flow" and eventually drains into streams. Streams are subject to flooding for brief periods which result in widened channels with bare, eroded banks. Erosion must be controlled to minimize sediment in stormwater. Existing stormwater systems should be retrofitted with pollution and discharge controls to reduce the sediment load and velocity of stormwater discharge.

Action Agenda

The Barnegat Bay water body, an important component of Ocean County's economy, is a recreational attraction for fishing, boating and bathing. The Bay's popularity as a summer vacation retreat and sporting playground has served as a catalyst to environmental decline and loss of sensitive areas. As discussed above, increased pollutant loading has had a detrimental effect on water quality and a deteriorating domino effect on all organisms that depend on the Bay for survival.

Increased development throughout the Bay watershed has slowly filled, cut down and paved-over sensitive areas. The real estate improvements met regulatory development standards, which attempted to mitigate and minimize negative environmental impacts. Mitigation was never 100% and adverse impacts slowly accumulated throughout the watershed, outside the jurisdiction

and accountability of any one municipality. Affirmative management practices implemented on a watershed basis are necessary to counteract mistakes of the past. We can no longer use the Bay without considering the negative impacts on sensitive areas which result from our use. We must begin to view the Bay as an entire watershed system of forests, wetlands, streams, tidal flats and the Bay's waters. We must become responsible stewards, amending regulations and our behavior to protect a sensitive resource so future generations may enjoy it.

With appropriate management of the watershed, the damage can be minimized. This will require coordinated action on the part of government and citizens to restore the environmental health of the Bay. The Action Plans in this chapter of the Watershed Management Plan for Barnegat Bay recommend new legislation, increased planning efforts, enhanced awareness of the importance of sensitive areas and modification of individual behavior. The Action Plans are organized around of the following objectives:

- 1) Maintain and improve the overall water quality of Barnegat Bay through environmentally sensitive land use practices and recreational use management.
- 2) Protect and enhance the quality of near shore and estuarine habitats critical to sustaining a balanced Bay ecosystem (i.e., areas east of Route 9)
- 3) Maintain and improve the quality and diversity of native flora, fauna and biological communities; enhance valuable natural habitats and features within the watershed of the Barnegat Bay ecosystem.

Objective 1 **Maintain and improve the overall water quality of Barnegat Bay through environmentally sensitive land use practices and recreational use management.**

Action Plan #3.1 **Protect intermittent streams by establishing policies which prohibit discharge of untreated stormwater into them.**

Rationale Intermittent stream corridors are habitats for rare and endangered flora and fauna. They are also habitat for recreationally and commercially important wildlife, especially as travel corridors between larger habitat areas. Intermittent streams are spring areas for freshwater and coastal streams in the Bay ecosystem. As headwater areas, these streams serve a critical role to the overall water quality of the watershed, especially those which function as groundwater discharge points. Due to their small size and impermanent nature, intermittent streams are very susceptible to surface and subsurface disturbances, particularly human related disturbances.

Lead Responsibility The N.J. Department of Environmental Protection and Energy should amend stormwater discharge policies to prohibit discharge of untreated stormwater into intermittent streams.

Cooperating Parties Ocean County Planning Board should amend County stormwater management regulations to prohibit future discharges. The County should also initiate action to decrease existing untreated discharges.

Resources No additional resources would be required for policy formulation. Funding would be required for modification of existing stormwater systems to eliminate untreated discharges.

Required Legislation None

**Action Plan
#3.2**

Draft and implement a regional stormwater management plan for the Barnegat Bay watershed. Identify sources of nonpoint pollution. (see also Action Plan #2.11)

Rationale

Most human activities and developments contribute to polluted runoff and discharges which then contribute to the deterioration of Barnegat Bay's water quality. Excess nutrients contribute to increased phytoplankton growth; excess sediments harm fish and clams. The sources and activities which contribute and result in polluted runoff need to be identified and controls need to be suggested and implemented to reduce degradation. The development of municipal stormwater plans is important, but due to the extralocal nature of stormwater, a regional plan is imperative. (see also Action Plan #2.1).

**Lead
Responsibility**

Ocean County Planning Board should initiate the data collection for sources of degradation and prepare the watershed stormwater management plan.

**Cooperating
Parties**

- 1) Technical assistance may be required from:
 - a) N.J. Department of Environmental Protection (DEPE)
 - b) U.S. Department Of Agriculture, Soil Conservation Service
 - c) Ocean County Soil Conservation District
- 2) Municipal planning boards should assist in the the data collection and implementation of a regional stormwater plan. Much of this data will have already been gathered as a result of activities conducted under the Sewer Infrastructure Improvement Act.

Resources

Additional funds will be required for data collection, research and preparation of a stormwater management plan. The State Legislature, the DEPE and the Ocean County Board of Chosen Freeholders should contribute funding to prepare this regional stormwater plan.

**Required
Legislation**

None

**Action Plan
#3.3**

Develop an educational program which promotes appreciation of the significance and protection needs of sensitive areas and encourages appropriate passive recreation. (see also Action Plans #7.4 and #7.7)

Rationale

Effective protection of sensitive areas requires the development of an appreciation of their ecological importance. Encouraging appropriate passive recreational and educational use of sensitive areas assists in their protection by minimizing impacts while developing an appreciation of the resources and establishing the reason for their protection. Educating citizens can lead to modified behavior and activities which lessen the negative impacts on the Bay.

**Lead
Responsibility**

Ocean County Department of Parks and Recreation

**Cooperating
Parties**

- 1) N.J. Department of Environmental Protection and Energy
- 2) N.J. Sea Grant Program
- 3) N.J. Marine Sciences Consortium
- 4) U.S. Fish and Wildlife Service
- 5) School systems in Ocean County
- 6) Environmental organizations

Resources

Private foundation grants should be sought by the appropriate public and nonprofit entities to assist in the development of a curriculum.

**Required
Legislation**

None

Objective 2 **Protect and enhance the quality of near shore and estuarine habitats critical to sustaining a balanced Bay ecosystem (i.e., areas east of Route 9).**

Action Plan #3.4A **Restrict access to estuarine habitats by posting near-shore critical habitats during the waterfowl nesting season (April 1 - August 15). Water craft landings should only be allowed under emergency circumstances. (see also Action Plan #4.2)**

Action Plan #3.4B **Prohibit anchoring watercraft within posted areas adjacent to critical habitats. Consider the minimum buffer areas:**

- 1) Nesting raptors = 300 feet**
- 2) Nesting black skimmers = 300 feet**
- 3) Nesting wading birds = 300 feet**
- 4) Nesting tern colonies = 150 feet**

Rationale **Near-shore critical habitats include endangered and threatened species habitats, colonial water bird nesting sites (e.g., herons, egrets, ibis, terns and skimmers), and migratory waterfowl stopover sites. Many of these species are not tolerant of human contact. Therefore, human disturbances can render habitat unsuitable for these important species, further threatening their survival in New Jersey. The major sources of impact to these habitats are personal watercraft (jet-skis) which can navigate shallow narrow waterways, anchoring of craft in proximity of these habitats and the landing of recreational craft on dredge spoil islands which provide critical habitat. However boats passing by these habitats cause only a temporary disturbance to the species of concern and over time those species are able to adapt to these disturbances. Therefore, this element of the management plan does not prohibit navigating in proximity to these habitats, but does seek to eliminate direct disturbances and occupation of the critical buffer area during breeding season.**

Lead Responsibility **The N.J. Department of Environmental Protection and Energy, Divisions of Parks and Forestry and Fish, Game and Wildlife should identify and post critical near-shore habitats and enforce access restrictions.**

Cooperating Parties

- 1) The Tidelands Resource Council, within its limited authority, should impose access restrictions to tidal areas, where necessary to protect critical habitats.
- 2) The N.J. State Police, Bureau of Marine Law Enforcement should assist in enforcing access restrictions.

Resources

Additional funding will be required by the N.J. State Police, Bureau of Marine Law Enforcement to enhance enforcement capabilities. This funding could be provided by increasing boat registration fees, which requires an amendment to R.S. 12:7-34.47 (Power Vessel Act). This money is already dedicated to marine law enforcement efforts pursuant to R.S. 12:7-34.48a.

Required Legislation

None

FIGURE 3

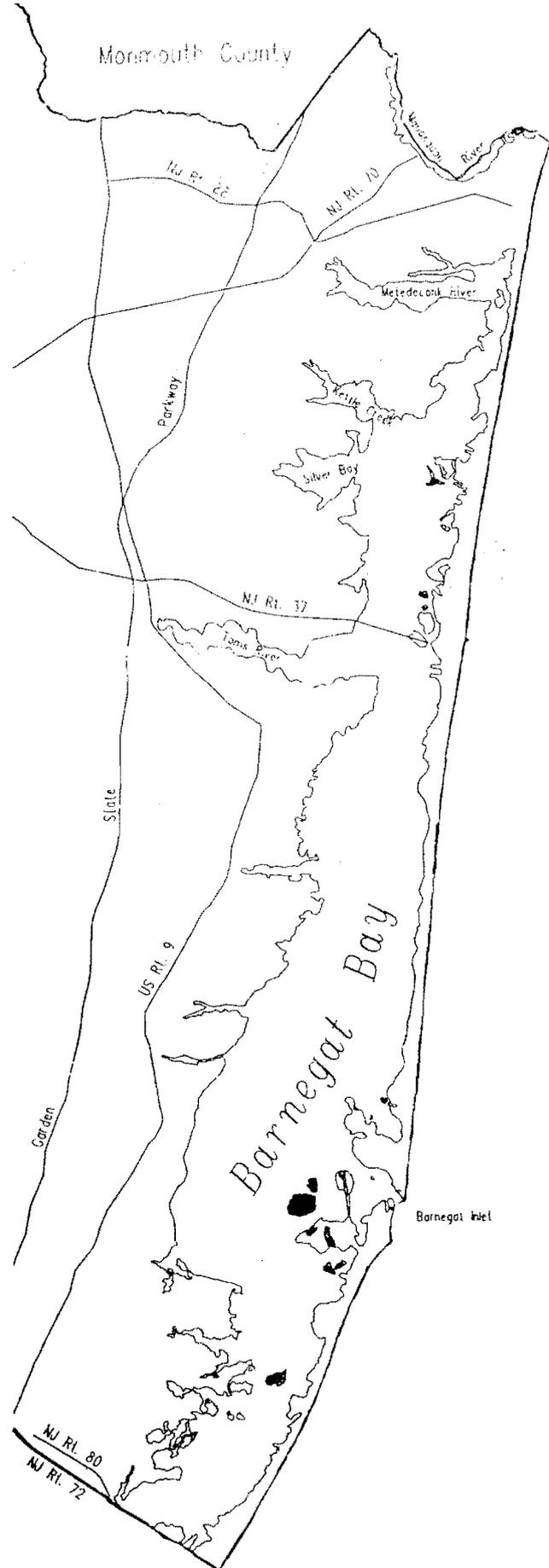
Colonial Waterbird Nesting Sites

LEGEND



Colonial Nesting Birds

Source: NJDEPE, Division of Fish, Game and Wildlife



**Action Plan
#3.5**

**For undeveloped areas:
Establish minimum buffers adjacent to
wetlands, waterways and sensitive habitats.
Consider the following minimum buffer areas:**

**A) Barnegat Bay - 100 feet, or erosion hazard area
(an area likely to be eroded in 30 years),
whichever is greater (see also Action Plans #3.6
and #4.18)**

B) Shorebird Habitats (April 1 to August 15)

- 1) Osprey - 300 feet**
- 2) Black Skimmer -300 feet**
- 3) Wading Birds - 300 feet**
- 4) Terns - 150 feet**

C) Intermittent Streams - 25 feet

**D) Wetlands and water areas supporting river otter
habitat- 300 feet**

E) Coastal Wetlands - to be determined

**G) All other wetland/waterways:
east of Route 9 - 100 feet
west of Route 9 - 50 feet**

Rationale

A buffer would preserve wildlife habitat and open space and will serve as a pollutant control zone to reduce the impacts of development upon wetlands and wetlands species. It would also provide temporary refuge for wetlands fauna during high water episodes, critical habitat for animals dependent upon but not resident in wetlands, and allow for slight variations of wetland boundaries over time due to hydrologic or climatologic effects. The bird species listed above are not tolerant of human contact. Human disturbances can render habitat unsuitable for these important species, further threatening their survival in the Barnegat Bay watershed. Current regulations only allow buffers for a single reason (e.g., flood control). There is a need to be able to comprehensively consider the value and purpose of buffers.

**Lead
Responsibility**

- 1) N.J. Legislature to amend the Wetlands Act of 1970 (N.J.S.A. 13:9A-1 et seq.)
- 2) Municipal governing bodies to adopt protective ordinances
- 3) N.J. Department of Environmental Protection and Energy (DEPE), Division of Fish, Game & Wildlife to restrict access to habitats under existing wildlife harassment provisions of Title 23 (the Fish, Game & Wildlife statutes)

**Cooperating
Parties**

Technical assistance may be required from the following:
1) DEPE, Office of Land and Water Planning
2) Ocean County Soil Conservation District

Resources

No significant financial resources required

**Required
Legislation**

Requires amendment to the Wetlands Act of 1970 (N.J.S.A. 13:9A-1 et seq.) or municipal ordinances need to be introduced.

Amendment of the Wetlands Act of 1970 to establish minimum buffers adjacent to coastal wetlands will serve to minimize the impacts of human activities on the wetlands regulated by the DEPE. Alternatively, adoption of municipal ordinances which establish minimum buffers adjacent to coastal wetlands will serve the same purposes as above and will minimize the impacts of human activities on the wetlands not currently regulated by the DEPE (development which falls below the threshold of the Coastal Area Facility Review Act and outside the wetlands boundary mapped under the Wetlands Act of 1970).

In addition, development of setbacks from the waters edge to maintain shoreline open space and habitat protection may require new municipal zoning ordinances or revisions to existing ordinances.

**Action Plan
#3.6**

Adopt municipal ordinances which recognize erosion hazard areas equivalent to the area likely to be eroded in 30 years and prohibit new development and redevelopment in this area.. (see also Action Plans #3.5 & #4.18)

Rationale

Beaches provide valuable forage areas for a variety of wading birds. Dune systems also provide habitats for wildlife species. Although comprehensive identification of appropriate areas may indicate that this policy is applicable in a limited number of locations, a setback equivalent to the 30 year erosion rate will provide important ecosystem protection at these sites. The Rules on Coastal Zone Management requires that all coastal development regulated under the Coastal Area Facilities Review Act be consistent with this policy. Adoption of similar municipal ordinances would provide for more comprehensive environmental protection and would increase municipal influence over local land use.

**Lead
Responsibility**

The N.J. Department of Environmental Protection and Energy (DEPE), Office of Land and Water Planning should promulgate model ordinances for municipal beach & dune setback ordinances

**Cooperating
Parties**

Ocean County bayfront municipalities should adopt DEPE model ordinances.

Resources

None

**Required
Legislation**

- 1) Municipalities need to adopt ordinances consistent with this action plan
- 2) Legislation is needed amending N.J.S.A. 13:19-1 et seq. (the Coastal Area Facility Review Act) to remove the exemption of 24 or fewer units so that this action plan can also be more comprehensively implemented by DEPE.
- 3) Strengthen the county enabling legislation and develop an interagency agreement in order to effect transference of the administrative requirements of the Coastal Area Facility Review Act (CAFRA) from DEPE to the Ocean County Planning Board. (see Action Plan #2.2)

Completion of any of the above legislative actions will provide for more thorough environmental protection by achieving interagency consistency and providing more regulatory authority on the local level.



- Action Plan #3.7A** Prohibit new or expanded marinas within shellfish habitat areas. (see also Action Plan #5.12)
- Action Plan #3.7B** Prohibit new dredging within shellfish habitat, except for existing marina facilities. Discourage new dredging adjacent to shellfish habitat, and where there is a demonstrated need and no feasible alternative, manage dredging to minimize any impact to the shellfish and their habitat. (see also Action Plans #4.13 and #5.12)
- Action Plan #3.7C** Allow maintenance dredging in shellfish habitat provided that impacts to the shellfish and the habitat are minimized, including the use of shellfish recovery programs. (see also Action Plans #4.13 and #5.12)
- Action Plan #3.7D** Prohibit new dredging in submerged aquatic vegetation (SAV) habitat, except where necessary to accommodate a needed public facility which has no prudent or feasible alternative location. (see also Action Plan #4.14)
- Action Plan #3.7E** Prohibit construction of new facilities, including marinas, launching ramps and private docks, in areas where SAV habitat must be traversed in order to access the open Bay, unless there is an existing channel or water depth of three feet or greater at mean low water over the habitat. Depths must be verified by survey. Only public facilities which have no prudent or feasible alternative non-SAV site, and for which there is a demonstrated demand which cannot be met by existing facilities, may be exempted from the policy.
- Rationale** Boating is an important recreational and economic resource in New Jersey. However, overuse of the Barnegat Bay and poorly sited facilities can have a significant adverse environmental effect on the Bay. For example, marinas sited in close proximity to shellfish beds can result in the closure of those beds for harvest. Similarly, facilities sited in areas where submerged aquatic vegetation exists result in pressure for new navigation channels which destroy the

vegetation. These reasons illustrate the need for managing boating facilities and activities.

**Lead
Responsibility**

- 1) The N.J. Department of Environmental Protection and Energy (DEPE) should revise the Rules on Coastal Zone Management to be consistent with these policies.
- 2) Municipalities should adopt ordinances which are consistent with these policies.

**Cooperating
Parties**

The DEPE Land Use Regulation Program needs to enforce new regulations through the permit process in consultation with the DEPE, Division of Fish, Game and Wildlife, Bureau of Shellfish and the DEPE, Science and Technical Programs, Bureau of Marine Water Classification.

Resources

None

**Required
Legislation**

Municipalities should adopt ordinances which are consistent with these policies.

**Action Plan
#3.8**

Create habitat using dredge spoils.

Rationale

Dredge spoils are a renewable resource that is generated from the routine maintenance of navigation channels. If used properly, these dredge spoils can serve a beneficial purpose by providing a viable habitat for birds which nest on isolated beaches.

**Lead
Responsibility**

The N.J. Department of Environmental Protection and Energy (DEPE), Division of Fish, Game and Wildlife should find potential sites for the creation of habitats from dredge spoils.

**Cooperating
Parties**

- 1) The Ocean County Soil Conservation District should assist in siting potential dredge spoil habitat sites.
- 2) Municipalities at the Bay's edge should cooperate with the DEPE, Bureau of Coastal Engineering in the creation of these habitats

Resources

None

**Required
Legislation**

The Fund for the Support of Free Public Schools (The School Fund) was created in the New Jersey Constitution of 1947 (Article VIII, section 4, paragraph 2). Title 18A-Education (N.J.S.A. 18A;56-1 et seq.) provides for the proceeds from the sale or lease of lands under water to be dedicated to support public schools (The School Fund). An amendment to N.J.S.A. 18A;56-1 et seq. is needed to exempt the DEPE, Bureau of Coastal Engineering from paying fair market value into the School Fund when creating habitat from dredge spoils.

**Action Plan
#3.9**

Consistently apply the regulations found in N.J.A.C. 7:7E-1.1 et seq. (Rules on Coastal Zone Management) which allow for maintenance of anadromous fish spawning runs within the Barnegat Bay watershed. (see also Action Plan #5.13)

- a) Prohibit development which creates a physical barrier to the movement of fish (e.g., dams, dikes, spillways and intake pipes) unless acceptable mitigating measures are used (e.g., fish ladders).
- b) Require mitigation measures for any development which would result in: lowering dissolved oxygen levels, raising ambient water temperature, causing siltation or raising turbidity levels.
- c) Incorporate mitigation access structures, such as fish ladders, on water's edge development
- d) Enhance anadromous fish spawning runs by installing fish ladders where needed, removing obstructions, stocking and other acceptable means.

Rationale

Two species of herring, an anadromous fish and important forage species, are found along New Jersey's coast in marine, estuarine and lacustrine habitats. Herring are of commercial importance as a human food source, crab bait, fish meal and fish oil. They play an important role in the food web, occupying an intermediate level between zooplankton and piscivores. The Rules on Coastal Zone Management offer protection of these fish and should be consistently applied.

**Lead
Responsibility**

N.J. Department of Environmental Protection and Energy (DEPE), Land Use Regulation Program to apply appropriate sections of N.J.A.C. 7:7E-1.1 et seq. to all appropriate development applications.

**Cooperating
Parties**

- 1) DEPE, Division of Fish, Game and Wildlife
- 2) U.S. Fish and Wildlife Service
- 3) U.S. Army Corp of Engineers

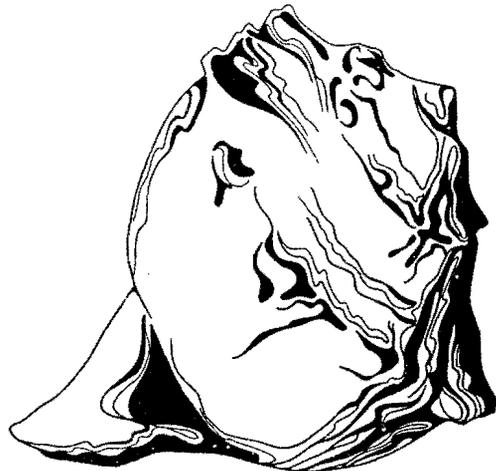
Resources

Funding will be required to construct migration access structures. Possible sources of funding are:

- 1) Permit fees for coastal development
- 2) Annual fee for coastal development having direct impact on Bay ecology
- 3) Mitigation fees for violations
- 4) Commercial harvester fees

**Required
Legislation**

None



Objective #3	Maintain and improve the quality and diversity of native flora, fauna and biological communities; enhance valuable natural habitats and features within the watershed of the Barnegat Bay ecosystem.
Action Plan #3.10	<p>Strengthen and rigorously enforce regulations to protect endangered and threatened species habitats from needless destruction by land development. Regulations include:</p> <ol style="list-style-type: none"> 1) <u>The Rules on Coastal Zone Management</u> 2) <u>Pinelands Comprehensive Management Plan</u> 3) <u>Freshwater Wetlands Protection Rules</u> 4) <u>Municipal zoning and development ordinances</u>
Rationale	Endangered and threatened species are facing possible extirpation in the watershed and State and possible extinction worldwide due to a loss of suitable habitat or past exploitation through human activities. Their disappearance from the Barnegat Bay watershed would represent a loss to human use, education, research and the quality of the ecological systems within the watershed.
Lead Responsibility	The N.J. Department of Environmental Protection and Energy (DEPE), Office of Land and Water Planning and Land Use Regulation Program should research enhanced protection standards.
Cooperating Parties	<ol style="list-style-type: none"> 1) N.J. Pinelands Commission 2) Municipal planning boards 3) DEPE, Division of Fish, Game & Wildlife, Endangered and Non-Game Species Program for assistance in identifying animal habitats 4) DEPE, Division of Parks & Forestry, Office of Natural Lands Management for assistance in identifying plant habitats
Resources	None
Required Legislation	<ol style="list-style-type: none"> 1) The Freshwater Wetlands Protection Act (N.J.S.A. 13:9B-1 <u>et seq.</u>) should be strengthened to classify wetlands providing habitat for State Endangered Plant Species as exceptional resource value wetlands

- 2) The Rules on Coastal Zone Management (N.J.A.C. 7:7E-1.1 et seq.) and Pinelands Comprehensive Management Plan regulations (N.J.S.A. 13:18A-1 et seq.) should be strengthened to provide protection to species identified as "Special Concern" pursuant to the State Endangered Plant Species List Act.
- 3) Municipal ordinances should be created to protect upland habitat for endangered and threatened species.
- 4) State statutes should be created to protect upland habitat for endangered and threatened species outside the Pinelands and Coastal Zones.



**Action Plan
#3.11**

Develop and implement sound management practices for rare and endangered species on publicly-owned lands. Research and amend management practices to monitor, protect and improve the condition of endangered and threatened species and habitats.

Rationale

Endangered and threatened species are facing possible extirpation in the watershed due to human activity and loss of habitat. Endangered and threatened species are integral components of natural ecological communities and are needed to sustain the ecological systems and the biological diversity of the watershed.

**Lead
Responsibility**

The following divisions of the N.J. Department of Environmental Protection and Energy should initiate the preparation of management practices:
1) Division of Parks and Forestry
2) Division of Fish Game and Wildlife

**Cooperating
Parties**

Conservation organizations could play a positive role by offering technical assistance in the preparation of management practices and in providing public education.

Resources

Additional funding may be required for species management research.

**Required
Legislation**

None

**Action Plan
#3.12**

Regulate access to undeveloped Bay islands to protect habitat.

Rationale

Bay islands contain valuable wildlife habitats or have the potential to become habitats. Their value for habitat areas stems from their isolation from human activity as compared to the intense development and use of oceanfront islands. These islands also contain and are adjacent to areas of high environmental sensitivity including wetlands, shellfish beds and rare and endangered wildlife habitats. Access to these islands could pose a great threat to these natural resources and habitats.

**Lead
Responsibility**

The N.J. Department of Environmental Protection and Energy (DEPE) should initiate revisions to the Rules on Coastal Zone Management (N.J.A.C. 7:7E-3.21 et seq.) to control access on undeveloped Bay islands.

**Cooperating
Parties**

- 1) The U.S. Coast Guard and N.J. Marine Police should assist in
the enforcement of access regulations to Bay islands to protect habitat.
- 2) The DEPE should also recommend legislative amendments to
the Coastal Area Facility Review Act (CAFRA) (N.J.S.A. 13:19-1 et seq.) to lower the 25-unit development threshold for CAFRA review so that this action plan can be comprehensively implemented.

Resources

Additional funding will be required by the N.J. State Police, Bureau of Marine Law Enforcement to enhance enforcement capabilities. This funding could be provided by increasing boat registration fees, which requires an amendment to R.S. 12:7-34.47. This money is already dedicated to marine law enforcement efforts pursuant to R.S. 12:7-34.48a.

**Required
Legislation**

The Legislature should examine and revise CAFRA to lower the 25-unit development threshold for CAFRA review so that this action plan can be comprehensively implemented.

**Action Plan
#3.13**

Recognize the value of forests and take steps to properly maintain and manage this resource. Monitor insects, diseases and growth characteristics.

Rationale

Forests stabilize soil, retard erosion and runoff, promote infiltration of surface water, reduce the force of the wind, provide food, shelter and breeding sites for wildlife and add aesthetic values for recreation and domestic life. Trees also release oxygen, filter particulate pollutants, and provide foods and fuel.

**Lead
Responsibility**

The N.J. Department of Environmental Protection and Energy, Division of Parks and Forestry, Bureau of Forest Management should undertake the following actions:

- 1) Cooperate with municipalities on the implementation of the Forest Health Monitoring Initiative Program and the Community Forestry Program.
- 2) Assist Ocean County Planning Board and Ocean County Department of Parks and Recreation on the formulation of a Forest Management Plan for Ocean County

**Cooperating
Parties**

The Rutgers Cooperative Extension of Ocean County should provide information and instruction on forest management to municipalities and landowners.

Resources

None

**Required
Legislation**

Municipalities should adopt tree removal ordinances that reflect a policy of no net loss of environmental benefits attributable to trees. (see also Action Plan #2.23)

**Action Plan
#3.14**

Adopt a uniform set of regulations statewide, including Pinelands and the Coastal Area Facility Review Act regions, which strengthen protection of Endangered and Threatened species and Species of Special Concern.

- 1) Prohibit possession, sale and transportation of any native plant or animal listed as Endangered, Threatened or of Special Concern**
- 2) Prohibit destruction and detrimental alteration of Endangered and Threatened species habitats**
- 3) Strengthen penalties for violations**

Rationale

Strengthened protection is needed to save rare and endangered species from extirpation in the state. Habitats should be protected from direct destruction due to development activities and hobbyists seeking specimens for collections. Penalties could be collected to offset enforcement costs.

**Lead
Responsibility**

- 1) The N.J. Department of Environmental Protection and Energy, Natural and Historic Resources Group should promulgate new regulations for species and habitat protection.
- 2) N.J. Pinelands Commission

**Cooperating
Parties**

- 1) Ocean County Environmental Agency
- 2) Conservation groups
- 3) Municipal environmental commissions

Resources

Funding will be required for enhanced enforcement. Fines collected for enforcement actions could be used to pay the salaries of the enforcement staff, however, this would require new legislation.

Required Legislation

Legislation will be required to strengthen species protection. The Massachusetts Endangered Species Act should be examined as a model for implementation (see Appendix 17).



CHAPTER IV: WATER AREA AND USE

Introduction

Barnegat Bay is increasingly popular among recreational boaters. In the Profile of the Barnegat Bay, Rogers, Golden, and Halpern estimate that of the boats registered in New Jersey, 30,000 different vessels used Barnegat Bay at some time during 1979. That number swelled to over 53,000 different vessels during 1988. These numbers do not include non-motorized watercraft less than 12 feet in length such as rowboats, rafts, small sailboats and wind surfers. While these numbers are a good representation of the popularity of recreational boating on Barnegat Bay, they cannot be used to estimate the volume of vessel traffic on the Bay. To estimate the actual number of boats operating on Barnegat Bay at any one time, the Department of Environmental Protection and Energy conducted an aerial survey on two Saturdays in mid-summer 1991. Based on these surveys, the Department estimates that, at times of peak use, more than 800 vessels were on the Bay at one time. Also these vessels are not distributed evenly on the Bay, resulting in identifiable high traffic areas. This volume of traffic results in three types of impacts on the Bay: natural resource impacts from boat operation; user conflicts, including accidents; and natural resource impacts from boating facilities. It is the intent of this plan to recommend means to minimize these three types of conflicts.

The Barnegat Bay encompasses 47,615 acres. Of this area, nearly half is less than 3 feet deep at mean low water. In addition, the Bay contains extensive eel grass and widgeon grass beds, as well as significant shellfish beds. Further discussions of these and other sensitive areas are contained in Chapter III, Sensitive Areas Protection. The number of power vessels operating on the Bay has the potential to severely impact these resources through prop scarp or increased turbidity resulting from navigating in areas with insufficient water depth. Further, this volume of vessel traffic can result in the erosion of natural shorelines due to wash and wake. As discussed in Chapter III, boat traffic can also result in disturbance to critical near shore habitats such as colonial water bird nesting or waterfowl staging areas. These types of impacts are most likely to occur in confined narrow waterways in and around dredge spoil islands.

The second type of impact to be addressed by this element of the Plan is that experienced by the Bay users. Though recreational boat registrations have increased dramatically statewide, reported accidents have not. However, user conflicts occur whenever one use of the Bay has a negative effect on another use. These types of impacts include vessel to vessel conflicts and the effects of watercraft operation on swimmers, docked craft, and waterfront residents.

Facility impacts result from the construction of piers, marinas, bulkheading and dredging. These facilities all require modifications to the natural environment, compromising natural shorelines and wetlands, submerged vegetation beds, shellfish beds, benthic communities and other important resources.

In addition to direct facility construction impacts, certain vessel-related impacts are more appropriately addressed at the dock. These include the overboard discharge of trash and sewage. To facilitate the consolidation of water quality impact issues resulting from boating, the contribution of motorboat exhaust and fuel leakage is also addressed here.

Action Agenda

The action steps outlined in the chapter are organized by water area and use objectives as follows:

Natural Resource Impacts from Boating

- 1) Reduce erosion of natural shorelines and wetlands when caused by wash and wake of watercraft
- 2) Restrict vessel operation to minimize the impact of boating on near-shore critical habitats.

User Conflicts

- 3) Regulate watercraft operation to minimize safety hazards and nuisance to waterfront residences.
- 4) Minimize the potential for conflicts between watercraft by identifying areas suitable for special uses and encouraging those uses in designated areas, consistent to the extent practicable, with existing use patterns, and by establishing special speed advisories in hazardous areas.
- 5) Improve boaters' adherence to existing Boat Operation Regulations (N.J.A.C. 7:6-1.1 et seq.).
- 6) Minimize the conflicts between watercraft and fishing equipment.

Water Use Facility Development/Impacts

- 7) Permit new or expanded facilities only in environmentally appropriate areas.
- 8) Minimize need for structural shore protection of natural shorelines.
- 9) Maintain navigation channels to facilitate recreational boating and minimize environmental disturbance.
- 10) Manage existing and proposed boating facilities to reduce boating impacts on the water quality of Barnegat Bay.

Natural Resource Impacts from Boating

Objective 1 **Reduce erosion of natural shorelines and wetlands when caused by wash and wake of watercraft.**

**Action Plan
#4.1**

Post "no wake" zones where vessel wakes are documented to be causing erosion of natural shorelines.

Rationale

Powered watercraft can raise significant wakes that have the potential to erode natural shorelines. Shorelines in confined areas of the Barnegat Bay which are not subject to significant natural wave action, due to a limited fetch, generally accumulate finer sediments and are vegetated. These vegetated shorelines contribute to the ecologic health of the Bay by providing cover and grazing habitat for waterfowl and shore birds. These shorelines also contribute significantly to the decomposer portion of the food web. These shorelines are also most prone to erosive damage from vessel wake.

In contrast, shorelines exposed to natural wave action generally consist of coarser sediments often appearing as sandy beaches. Where wetlands exist in these areas, they are usually protected by extensive mud flats or offshore sand bars. Vessel wakes in these areas are less likely to produce an erosive impact discernible from the natural wave action.

New rules concerning vessel speeds were promulgated in the April 15, 1991 New Jersey Register by the Boat Regulation Commission, (N.J.A.C. 7:6-1.31). The new regulations require power vessels to maintain minimum headway when passing through lagoons, canals or other confined areas less than 200 feet wide. The effectiveness of this rule toward eliminating shoreline erosion is not known at this time. However, new recommendations concerning vessel wakes should not be proposed until this new rule can be evaluated. In the interim, if shoreline erosion resulting from vessel wakes can be identified and documented, additional precautions such as posting "no wake" zones to protect specific areas should be taken.

**Lead
Responsibility**

- 1) N.J. Department of Law and Public Safety
- 2) N.J. Boat Regulation Commission

Cooperating Parties

- 1) N.J. Department of Environmental Protection and E (DEPE), Office of Land and Water Planning and DEPE, Engineering and Construction Element t confirm source of shoreline erosion
- 2) N.J. State Police, Bureau of Marine Law Enforceme enforcement of "no wake" zones

Resources

This can be accomplished with existing resources.

Required Legislation

New "no wake" zone designations based entirely on environmental considerations may require authority be that afforded by the navigation statutes found at Title 12. Legislation amending R.S. 12:7-1 et seq. or supplement Title 13, the environmental protection statutes, may be necessary to grant the authority for boat operation regulations based on environmental considerations. Further legal interpretation is needed.

Objective 2	Minimize the impact of boating on near-shore critical habitats. (see also Action Plan #3.4)
Action Plan #4.2	Improve enforcement of the adopted noise standard for motorized vessels.
Rationale	<p>Near-shore critical habitats include endangered and threatened species habitats, colonial water bird nesting sites (such as herons, egrets, ibis, terns, and skimmers), and migratory waterfowl stopover sites. Many of these species are not tolerant of human contact. Therefore, human disturbances such as excessive noise, can render habitat unsuitable for these important species, further threatening their survival in New Jersey.</p> <p>New noise standards were adopted at N.J.A.C. 7:6-6.3 which permit a "standing" test rather than a "pass-by" test to be administered. This will make enforcement of the noise standard easier. Increased awareness by the boating public and stricter enforcement of these regulations will address many of the conflicts between boating and animals in near-shore critical habitats.</p>
Lead Responsibility	<p>1) N.J. Department of Law and Public Safety 2) N.J. State Police, Bureau of Marine Law Enforcement</p>
Cooperating Parties	None
Resources	Additional personnel may be needed by the Bureau of Marine Law Enforcement.
Required Legislation	None

Barnegat Bay User Conflicts

Objective 3 Regulate watercraft operation to minimize safety hazards and nuisance to waterfront residences.

**Action Plan
#4.3**

Prior to operating any vessel on New Jersey waters, require all persons under 17 years of age on the date of enactment to attend a boating safety course sanctioned by the N.J. State Police, Bureau of Marine Law Enforcement and to carry certification of such attendance at all times when operating any watercraft on New Jersey waters.

Rationale

The existing certification requirements apply only to persons under the age of 17. However, many persons never operate a boat until after they have reached the age of 17. Therefore, they are never required to take a basic safety course which explains the "rules of the road" and good seamanship. This program would require all persons not 17 on a specific static date to take an approved boat safety course prior to operating any watercraft in the future. The result of this requirement would be to slowly but steadily increase the number of boaters who have had formal training in the proper operation of boats.

**Lead
Responsibility**

N.J. State Legislature

**Cooperating
Parties**

- 1) N.J. State Police, Bureau of Marine Law Enforcement or Division of Motor Vehicles to establish certification procedure
- 2) U.S. Coast Guard Auxiliary
- 3) U.S. Power Squadron

Resources

Funds needed to expand the existing certification program could be raised through a nominal fee for certification.

**Required
Legislation**

Implementation of this program would require an amendment to R.S. 12:7-61.

**Action Plan
#4.4**

Apply the April 15, 1991 power vessel regulations amendments to personal watercraft (jet-skis) as well as other motor boats. These amendments require power vessels to reduce their speed to minimum headway when operating within 200 feet of any marina, pier, dock, or wharf and when passing work barges, or navigating through bridge spans and confined waterways less than 200 feet wide. This will require either a broader interpretation of the April 15, 1991 amendments or the promulgation of similar, new, regulations at N.J.A.C. 7:6-9.3.

Rationale

The numbers of motorized watercraft operating on Barnegat Bay are creating nearly continuous traffic in small channels adjacent to residential areas during peak use hours. This continual traffic can not only be injurious to docked vessels and protected shorelines if "no wake" zones are ignored, but also can be intrusive on the homeowners if muffling devices have been altered or are not maintained. The existing navigation regulations address these issues (N.J.A.C. 7:6-1.1 et seq.). Amendments to those regulations at N.J.A.C. 7:6-1.31 became effective April 15, 1991, requiring power vessels to slow to minimum headway when passing within 200 feet of a developed waterfront. However, these regulations are not applied to personal watercraft by the Bureau of Marine Law Enforcement. Personal watercraft are the targets of many complaints from waterfront residents. By applying the same "no wake" or minimum headway regulations to these craft as are currently being applied to other power vessels, a 200 foot buffer will be maintained between these craft and occupied waterfronts. This should alleviate many of the conflicts between personal watercraft use and waterfront residents.

**Lead
Responsibility**

N.J. State Police, Bureau of Marine Law Enforcement, and the N.J. Boat Regulation Commission for the interpretation, promulgation and enforcement of amendments to the navigation regulations.

**Cooperating
Parties**

None

Resources

Can be accomplished with existing resources.

**Required
Legislation**

None

Objective 4	Minimize the potential for conflicts between watercraft and between watercraft and other Bay users.
Action Plan #4.5A	Identify specific areas of Barnegat Bay with existing traffic congestion and issue an advisory to check speed and use caution in those areas. Include this information in a brochure such as the one called for in Action Plan #7.11.
Action Plan #4.5B	Identify existing special use areas (e.g., areas with concentrations of sailboats, jet skis, water skiers, etc.) and encourage those uses in appropriate areas. Issue an advisory to other vessels to use caution when crossing those areas. Include this information in the brochure developed pursuant to Action Plan #7.11.
Rationale	<p>To date, a dramatic increase in reported boating accidents has not been experienced. However, accident data may not be indicative of the number of boaters experiencing degraded recreational quality in their use of Barnegat Bay, or those who feel navigation on the Bay is hazardous, particularly during peak use days such as holidays and weekends.</p> <p>Regulation of boat use is the most direct and effective means of reducing conflicts between users of Barnegat Bay. It is also the most distasteful to the boaters themselves. Regulations are necessary to address documented hazards to navigation. The reported accidents and the observations of the Marine Police have not demonstrated a pattern which would indicate documented problems in specific areas, therefore new regulation is not recommended at this time. Rather, the plan recommends that advisories be used in specific areas of the Bay where there is a higher potential for accidents, such as areas where vessel traffic is concentrated or special uses are occurring. If the advisories are not successful in preventing accidents they could be easily adopted as regulations.</p>
Lead Responsibility	N.J. Department of Environmental Protection and Energy (DEPE), Office of Land and Water Planning

Cooperating Parties

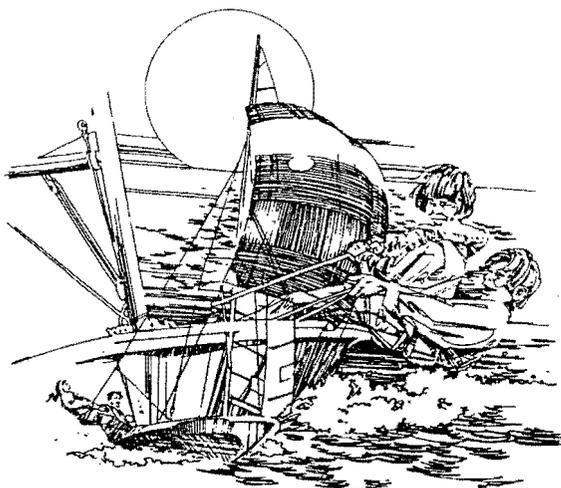
- 1) N.J. Boat Regulation Commission and N.J. State Police, Bureau of Marine Law Enforcement during brochure development
- 2) DEPE, Office of Communication and Public Education for brochure design
- 3) Division of Motor Vehicles for brochure distribution

Resources

Funding is needed to publish a public information brochure. Funding should come from the N.J. Department of Law and Public Safety, but may possibly be available from the DEPE or the N.J. Sea Grant Program.

Required Legislation

None



**Action Plan
#4.6**

Encourage special events, such as boating regattas, to locate courses outside of navigation channels, but without damaging submerged aquatic vegetation.

Rationale

The goal of this action plan is to keep channels open for watercraft that are destination oriented or require deeper drafts. This is done by encouraging uses that follow circuitous patterns or which must cross back and forth to locate in areas suitable for those uses and which do not interfere with navigation channels.

**Lead
Responsibility**

N.J. State Police, Bureau of Marine Law Enforcement.

**Cooperating
Parties**

N.J. Boat Regulation Commission

Resources

This can be accomplished with existing resources.

**Required
Legislation**

None, this can be accomplished under the boating regulations at N.J.A.C. 7:6-1.30 to require a review similar to that required for non-tidal waters at N.J.A.C. 7:6-4.6. This statute requires every incorporated yacht club or racing association to secure a permit from the N.J. Department of Law and Public Safety prior to holding a race.

**Action Plan
#4.7**

Encourage all watercraft to observe a minimum 50 foot buffer from any bathing beach marked by buoys or signs.

Rationale

Present regulations governing the operation of personal watercraft prohibit their operation above idle speed within 50 feet of a buoyed bathing area. No such restriction applies to other power vessels. While the Department of Environmental Protection and Energy has no documentation that indicates a problem exists between power boats and bathing areas, the broad application of the 50 foot buffer to all power vessels appears to be a prudent requirement to protect public safety.

**Lead
Responsibility**

N.J. Boat Regulation Commission to amend the boating regulations at N.J.A.C. 7:6-1.31.

**Cooperating
Parties**

N.J. State Police, Bureau of Marine Law Enforcement

Resources

This can be accomplished with existing resources.

**Required
Legislation**

None

Objective 5	Improve boaters' adherence to existing Boat Operation Regulations (N.J.A.C. 7:6-1.1 <u>et seq.</u>).
Action Plan #4.8	Increase the presence of N.J. Marine Law Enforcement Officers on Barnegat Bay during the peak boating season (May 1 - October 1).
Rationale	<p>The existing boat regulations (N.J.A.C. 7:6-1.1 <u>et seq.</u>) address many of the conflicts which can be anticipated to occur in the Barnegat Bay. These regulations address issues such as water skiing, personal watercraft operation, muffling devices and noise control, transferring a race course, anchoring in and near channels, speed and wake responsibility, and general rules of the water.</p> <p>In spite of these regulations the Bureau of Marine Law Enforcement received 52 accident reports in the study area during 1990, resulting in 19 injuries and no fatalities. Unfortunately, during the 1991 boating season three persons were killed in a boat collision near the Mantoloking Bridge. While 52 accidents on the Bay does not appear extreme, considering the number of vessels using the Bay, these numbers do not represent other conflicts such as near collisions or nuisances. Also, as the popularity of boating increases, the number of incidents is also likely to increase. Therefore, the existence of these user conflicts in the presence of seemingly adequate regulations indicates the need for increased marine police coverage and, hence, increased enforcement of the regulations, during the peak season.</p>
Lead Responsibility	N.J. State Police must allocate additional personnel to the Bureau of Marine Law Enforcement.
Cooperating Parties	None
Resources	Funding is needed to pay for additional marine law enforcement personnel. This funding could be provided by increasing boat registration fees (requires an amendment to R.S. 12:7-34.47). This money is already dedicated to marine law enforcement efforts pursuant to R.S. 12:7-34.48a.
Required Legislation	None

**Action Plan
#4.9A**

Ensure that penalties for violations of the Boat Operation Regulations are sufficient to compel compliance.

**Action Plan
#4.9B**

Require persons cited for repeated boat operation violations to complete an approved boating safety course and present proof of completion to the Division of Motor Vehicles, Bureau of Marine Law Enforcement or municipal court as appropriate.

Rationale

Members of the Citizens Advisory Committee suggest that penalties levied for violation of the boat operation regulations (N.J.S.A. 12:7, the New Jersey Boat Act of 1962) are not sufficient to compel compliance with the regulations, given that the cost of boat operation is so high anyway. Further, since no license is required to operate a boat, there is no secondary penalty such as the possible loss of license, as there is for automobile operation. Also, there is no way of ensuring that the violators are aware of boating regulations, rules of the road and good seamanship. A system of increased fines and mandatory education for repeat violators would deter future violations.

**Lead
Responsibility**

- 1) N.J. State Police, Bureau of Marine Law Enforcement
- 2) N.J. Boat Regulation Commission.

**Cooperating
Parties**

U.S. Coast Guard and Power Squadron to administer safety classes

Resources

Funds necessary for this program could be raised through a fee for attendance in the boat safety course.

**Required
Legislation**

It is unclear whether amendments to N.J.S.A. 12:7 are required to establish a uniform and effective fee schedule for violations of boat operation regulations. This issue should be studied by the Boat Regulation Commission.

**Action Plan
#4.10**

Encourage local law enforcement personnel to assist in the enforcement of navigation regulations within their respective jurisdiction. Encouragement could be in the form of a one day seminar conducted by the N.J. State Police, Bureau of Marine Law Enforcement to explain the regulations and enforcement procedures.

Rationale

A considerable number of waterfront residents have expressed that they experience a problem with power vessel operation close to the shore damaging their boats due to wash and wake. Also, personal watercraft (jet skis) were repeatedly cited as creating a nuisance due to the noise they produce. This is evidenced by several shore communities attempting to ban personal watercraft during the summer of 1991. The types of vessel operation which create these problems are not in compliance with existing navigation regulations, however, there are not enough marine law enforcement officers to ensure enforcement of these regulations (see also Action Plan #4.8). Local law enforcement personnel can assist in the enforcement of the regulations, although they will probably require procedural training by the Bureau of Marine Law Enforcement.

**Lead
Responsibility**

N.J. State Police, Bureau of Marine Law Enforcement

**Cooperating
Parties**

Municipal law enforcement agencies

Resources

Can be accomplished by existing local law enforcement officers, and may reduce the need for additional State marine law enforcement officers.

**Required
Legislation**

None. The authority for local enforcement of the navigation regulations is already provided at N.J.S.A. 12:7-34.31 as interpreted by Attorney General F. O. 1956, No. 10. Authority also exists for municipal ordinances that are consistent with State regulations, see N.J.S.A. 12:7-34.53.

**Action Plan
#4.11**

Return fines collected for violations of the boat operation regulations to the law enforcement agency issuing the citation, for the purpose of funding enforcement of the boat operation regulations.

Rationale

As was identified in Action Plan #4.8, additional funding is needed to support marine law enforcement. Use of fines collected by the enforcement officers provides a viable source for this funding.

**Lead
Responsibility**

N.J. State Legislature

**Cooperating
Parties**

None

Resources

This can be accomplished with existing resources.

**Required
Legislation**

An amendment to R.S. 12:7-23.6 is required to return fines to the law enforcement agencies rather than the General Fund of the State Treasury.

Objective 6	Minimize the conflicts between watercraft and fishing equipment.
Action Plan #4.12	Prohibit the placement of crab pots in specified waters of the Barnegat Bay watershed where there will be less than four feet of water above the pot at mean low water unless they are marked with a float. (see also Action Plans #5.1 through #5.6)
Rationale	During the development of this plan several members of the N.J. Department of Environmental Protection and Energy (DEPE) and Citizens Advisory Committee expressed concern about hitting crab pots in shallow water with their boats. These conflicts could be avoided by either requiring floats on all crab pots placed in shallow water or by prohibiting the placement of crab pots in shallow water altogether.
Lead Responsibility	DEPE, Division of Fish Game and Wildlife, to identify restricted areas and modify existing regulations at N.J.A.C. 7:25-14, which address crab pots
Cooperating Parties	The fishing industry
Resources	This can be accomplished with existing resources.
Required Legislation	None

Water Use Facility Development/Impacts

Objective 7 Permit new or expanded facilities only in environmentally appropriate areas.

**Action Plan
#4.13A**

Maintain existing navigation channels and channel markings to ensure safe boating. However, seasonal restrictions shall be observed to avoid unnecessary damage to shellfish, blue crab, sturgeon, anadromous species, etc. as determined on a project-specific basis in consultation with the N.J. Department of Environmental Protection and Energy (DEPE). Shellfish recovery programs shall be utilized whenever feasible. At all times, further disturbance to submerged aquatic vegetation beds shall be minimized. (see also Action Plans #3.7 and #5.4)

#4.13B Prohibit new navigation channels in sensitive areas, such as submerged aquatic vegetation habitat and shellfish beds, except where necessary to meet an existing use that is currently adversely impacting the sensitive resource and for which there are no alternative locations. (see also Action Plans #3.7 and #5.4)

#4.13C Provide a stable source of funding for the maintenance of navigation channels. A possible source of stable funding is to dedicate that portion of the motor fuel tax receipts attributable to recreational boating to channel maintenance and other boating improvement activities such as boat ramp construction and pumpout facility installation.

Rationale Maintenance and new dredging is necessary to provide access to marinas, docks, ports, and other appropriate water dependent development, but it must be carried out in such a way that environmentally sensitive areas are not unnecessarily disturbed.

The information available on aquatic species responses and/or mortality due to dredge-induced water quality changes is incomplete. It is known however that egg and larval forms of aquatic biota are more sensitive than adult stages. American oyster eggs and larvae are known to be sensitive to turbidity levels and durations that typically occur at mechanical dredging sites. Turbidity is known to block upstream migration of striped bass. Turbidity may, therefore, block other anadromous species during spring upstream migration. Turbidity also blocks out light which is

necessary for the growth of vegetation and the potential exists that the dredging turbidity plume could carry fecal bacteria into harvestable shellfish beds.

Aquatic fin fish and blue crab which winter in the estuarine waters are lethargic at cold water temperatures. Large scale mechanical or hydraulic dredging could entrain and kill significant numbers, since they would not be able to evacuate a dredging area. This dredging would also destroy stable submerged aquatic vegetation.

The additional impacts associated with new dredging are permanent physical changes in water depth, circulation, and sediment types. Dredged areas which are deeper than surrounding waters or deeper than connecting channels are known to seasonally have bottom waters which are devoid of oxygen. Benthic organisms and finfish can not survive with this lack of oxygen.

**Lead
Responsibility**

- 1) DEPE should revise the shellfish policies in the Rules on Coastal Zone Management to be consistent with these action plans.
- 2) DEPE, Engineering and Construction Element should maintain navigation channels
- 3) Municipalities should adopt ordinances which are consistent with these action plans.

**Cooperating
Parties**

DEPE, Land Use Regulation Program to enforce current new regulations through the permit review process in consultation with the DEPE, Division of Fish, Game and Wildlife, Bureau of Shellfish and the DEPE, Science and Technical Programs, Bureau of Marine Water Classification.

Resources

\$1,000,000 to \$2,000,000 will be required annually (1991 dollars). Stable sources of funding may include dedicating that portion of the motor fuel tax receipts attributable to motor boating to a boating improvement fund which could be used to improve boating access, maintain channels and provide other needed facilities such as pumpouts.

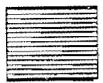
**Required
Legislation**

Adequate funds must be appropriated to maintain existing navigation channels or a stable source of funding must be approved.

Municipalities should adopt ordinances which are consistent with these action plans.

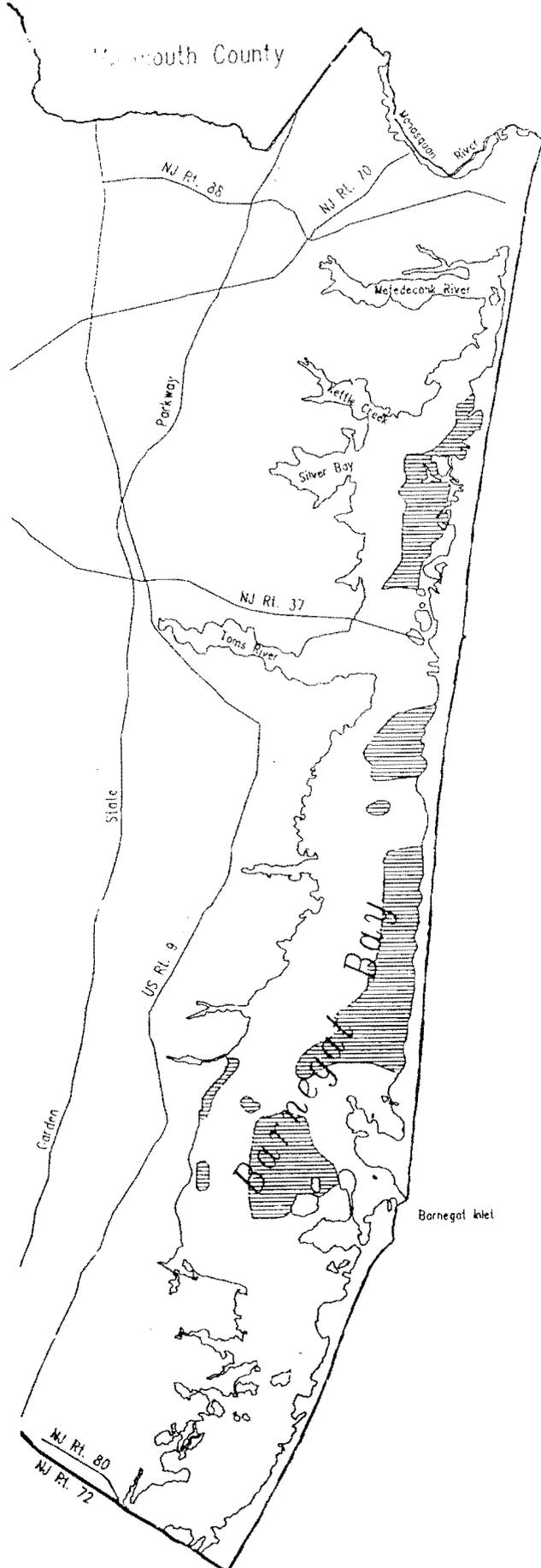
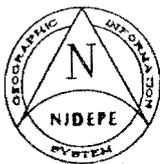
FIGURE 4

Eel Grass Beds



Eel Grass

Source: NJDEPE, Nacote Creek
Shellfish Office



**Action Plan
#4.14**

Prohibit new facilities, including private boat slips, in areas where new crossings of submerged aquatic vegetation (SAV) habitat would be required, unless water depth at the facility and access from the facility to the open Bay is at least three feet at mean low water. Public facilities may be permitted in these areas only if there is a demonstrated need, there are no alternative sites which meet the above criteria and impacts are fully mitigated. (see also Action Plan #3.7)

Rationale

Several factors influence the distribution and density of submerged aquatic vegetation including depth, wave action, substrate and light penetration. Submerged aquatic vegetation provides several benefits to the estuary's ecosystem including forage for waterfowl and fish, nursery areas for crabs and scallops, trapping of suspended sediments and significant contributions to the detrital food web. Activities which disturb bottom sediments or reduce light penetration have a propensity to destroy submerged aquatic vegetation beds.

The operation of power vessels across shallow beds can physically damage submerged vegetation and result in chronic minor disturbances such as prop scars. While singular scars from crossings are probably quickly repaired by rhizomes and new shoots, the cumulative effect of many crossings could be destructive to the bed. From aerial observations of prop scar in SAV beds the N.J. Department of Environmental Protection and Energy (DEPE) has reason to suspect that motorboating is having an adverse impact on SAV. New docks and other facilities in areas where submerged vegetation crossings would be required that cannot be accommodated by existing channels are prohibited unless sufficient draft is available over the beds. These facilities, if permitted, would add pressure for new channels, resulting in destruction of submerged vegetation habitat. Providing adequate opportunities for public access to coastal waters is an important component of this plan. Therefore, public facilities which provide needed access for the general public and which have no prudent or feasible alternative site will be considered on a case-by-case basis. Any new public facility resulting in damage to SAV habitat must mitigate that damage.

**Lead
Responsibility**

- 1) DEPE should revise the submerged vegetation and docks and piers policies in the Rules on Coastal Zone Management to be consistent with this action plan.
- 2) Municipalities should adopt ordinances which are consistent with this action plan.

**Cooperating
Parties**

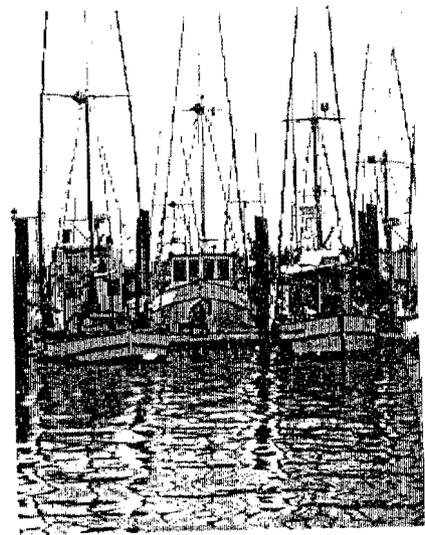
DEPE, Land Use Regulation Program for policy implementation

Resources

This can be accomplished with existing resources.

**Required
Legislation**

Municipalities should adopt ordinances which are consistent with this action plan.



**Action Plan
#4.15A**

Encourage new or expanded marinas and launching sites in areas which require minimal dredging and have direct access to navigable waters of sufficient depth to accommodate recreational vessels. Discourage new facilities in areas where subtidal and intertidal shallows require extensive dredging.

**Action Plan
#4.15B**

Encourage new or expanded marinas on filled water's edge sites or other water's edge sites where wetlands disturbance will be minimal. Discourage new or expanded marinas in areas where extensive wetlands disturbance would be required.

**Action Plan
#4.15C**

Preserve existing marinas and boat launches, which are open to the public and are in appropriate locations, through incentive programs, development right acquisition and/or regulation.

**Action Plan
#4.15D**

Encourage expansion of existing marinas and dry stack marina construction in appropriate locations, as opposed to the construction of new wet slip marinas.

Rationale

Boating is an important recreational and economic resource in New Jersey. However, overuse of the Barnegat Bay and poorly sited facilities can have a significant adverse environmental effect on the Bay. For example, marinas sited in close proximity to shellfish beds can result in the closure of those beds for harvest. Similarly, facilities sited in areas where submerged aquatic vegetation must be crossed results in pressure for new navigation channels which destroy the vegetation. For this reason boating facilities need to be managed.

Appropriate sites for new boating facilities are in short supply around Barnegat Bay. Therefore, the goal of the management strategy should be to preserve the existing boating opportunities in the region, rather than developing new facilities which would compromise environmental resources.

Conversions of marinas to residential use not only can result in the loss of slips available to the public, but may result in the loss of services essential to the recreational boating industry. These services include: engine repair, travel lifts, winter storage, fueling, bait and tackle, etc.

Further, the proximity of these homes to the remaining slips removes needed buffers for painting and sanding and other normal marina activities. Therefore, it is essential to protect both the slips and the upland portions of marinas from use conversion. This protection may take the form of incentives (such as tax relief), purchase (such as development right acquisition), or land use regulation, which should occur at both the State and local levels of government and be accompanied by lower property taxes reflecting those use restrictions. (For more information, see Competition for New Jersey's Waterfront by the N.J. Department of Environmental Protection and Energy, Division of Coastal Resources, October, 1990.)

**Lead
Responsibility**

- 1) N.J. Department of Environmental Protection and Energy (DEPE) needs to make revisions to the recreational use policies in the Rules on Coastal Zone Management to be consistent with these action plans.
- 2) Municipalities should adopt ordinances which are consistent with these action plans.

**Cooperating
Parties**

- 1) DEPE, Land Use Regulation Program for implementation of rule changes through permit programs
- 2) Local governments for land use zoning consistent with State policies encouraging the preservation of marinas and providing tax incentives as appropriate, such as using the property's value as a marina for the calculation of the assessed value
- 3) DEPE, Green Acres Program for possible acquisition of marinas threatened by other development

Resources

Funding will be needed if marinas are to be protected from use conversions through development right acquisition. Such funding would have to be appropriated by the legislature, or raised through a bond issue. Green Acres funds could theoretically be used for marina acquisition; however, the preservation of open space and valuable natural habitats threatened by development should continue to receive priority consideration for Green Acres' limited funds.

**Required
Legislation**

- 1) Municipalities need to adopt ordinances which are consistent with these action plans.
- 2) The Legislature should examine and revise the Coastal Area Facility Review Act (CAFRA) (N.J.S.A. 13:19-1 et seq.) to lower the 25-unit development threshold for CAFRA review so that this action plan can be comprehensively implemented. Legislation is also

required to provide funding for development right acquisition, or to provide property tax relief without restricting the development potential of marinas for other uses.

- 3) Strengthen the county enabling legislation and develop an interagency agreement in order to effect transference of the administrative requirements of CAFRA from DEPE to the Ocean County Planning Board. (see Action Plan #2.2)

Completion of any of the above legislative actions will provide for more thorough environmental protection while achieving interagency consistency and providing more regulatory authority on the local level.

**Action Plan
#4.16**

Clarify the application of the Antidegradation Policies in the Surface Water Quality Standards, N.J.A.C. 7:9-4.5d, as they apply to recreational boating facilities in Category One Waters. Evaluate Category One Waters for inclusion as a Special Area under the Rules on Coastal Zone Management.

Rationale

Category One waters include (among others) shellfish waters of exceptional resource value and waters that flow through or border Federal, State, County or municipal parks and wildlife areas. All of Barnegat Bay has been designated as a Category One water in the New Jersey Surface Water Quality Standards (N.J.A.C. 7:9-4.1 et seq.). Within all Category One waters the Antidegradation Policies are applied. These policies are designed to protect the propagation of fish, shellfish, and other organisms that make up the aquatic community. These policies are also intended to protect existing and designated uses of those waters, such as shellfishing and swimming. In particular, these policies prohibit new uses which would result in predictable or measurable changes to the existing water quality.

Marina construction often results in a closure of waters for shellfishing based on potential fecal coliform contamination due to the overboard discharge of sewage. A literal interpretation of the Antidegradation Policies would, therefore, preclude any future marina development in Category One waters and consequently in Barnegat Bay.

This plan recognizes the importance of protecting shellfish beds from contamination, but must also recognize that significant areas of Barnegat Bay do not support shellfish. Recreational boating is also an important use of Barnegat Bay, therefore opportunities for boating must also be afforded. We believe that these conflicting uses can coexist in Barnegat Bay and recommend that the Antidegradation Policies be interpreted and clarified to allow marinas in appropriate locations.

**Lead
Responsibility**

N.J. Department of Environmental Protection and Energy (DEPE), Office of Land and Water Planning to clarify application of the Antidegradation Policies to boating facilities and for amendments to N.J.A.C. 7:7E-3 to include Category I waters as a Special Area in the Rules on Coastal Zone Management.

Cooperating Parties

- 1) DEPE, Office of Land and Water Planning, Standards and Systems Analysis, for Antidegradation Policy interpretation
- 2) DEPE, Land Use Regulation Program for the implementation of rule changes through existing permit programs
- 3) Local governments to amend zoning ordinances to become consistent with State policies

Resources

This can be accomplished with existing resources.

Required Legislation

None



**Action Plan
#4.17**

Prepare a map indicating where launching ramp and marina construction should be encouraged, and identifying areas that are generally unsuitable for boating facility construction.

Rationale

The mapping of suitable locations for boating facilities will serve as a guide to potential developers and assist them in making the best use of their time and effort when making development proposals, while also protecting natural resources.

**Lead
Responsibility**

N.J. Department of Environmental Protection and Energy,
Office of Land and Water Planning

**Cooperating
Parties**

Ocean County Planning Board

Resources

This can be accomplished with existing resources.

**Required
Legislation**

None

Objective 8	Minimize need for structural shore protection of natural shorelines.
Action Plan #4.18A	Allow new structural shore protection only to protect water dependent uses. Prohibit new structural shore protection for any new structures except where such protection meets infill criteria.
Action Plan #4.18B	Identify shorelines which are eroding and require any new structures to observe a minimum setback equivalent to the 30 year erosion rate to reduce the need for future shore protection. (see also Action Plans #3.5 & #3.6)
Action Plan #4.18C	Require non-structural shore protection alternatives to be exhausted before structural shore protection is permitted for existing structures.
Action Plan #4.18D	Employ sloped, rather than vertical, shore protection where practicable and necessary to protect existing structures. Set shore protection at the existing shoreline, upland of any wetland which may exist at the shoreline.
Rationale	<p>Natural shorelines provide both aesthetic and environmental benefits. Structural shore protection eliminates the transitional zone between the aquatic and terrestrial ecosystems. This transitional area provides forage and refuge for many aquatic species and their juveniles. This area is also a primary contributor to the estuary's energy and nutrient cycles. In addition, this edge area filters runoff from the terrestrial landscape, acting as a sink for excess nutrients and contaminants.</p> <p>The construction of bulkheads eliminates this valuable interface between the water and the land. Even when constructed landward of a vegetational fringe, waves reflected off of a vertical structure scour the area in front of the bulkhead, thereby eliminating vegetation. Therefore, where shore protection is necessary to protect existing structures, vegetative shoreline stabilization should be encouraged first, and where infeasible, sloped revetments should be used rather than vertical structures.</p>

**Lead
Responsibility**

Municipalities should adopt ordinances which are consistent with these action plans.

**Cooperating
Parties**

N.J. Department of Environmental Protection and Energy (DEPE) should identify shorelines which are eroding.

Resources

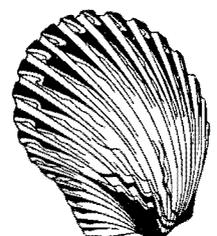
This can be accomplished with existing resources.

**Required
Legislation**

- 1) Municipalities need to adopt ordinances which are consistent with these action plans.
- 2) The Legislature should examine and revise the Coastal Area Facility Review Act (CAFRA) (N.J.S.A. 13:19-1 et seq.) to lower the 25-unit development threshold for CAFRA review so that this action plan can be comprehensively implemented. This authority is necessary in order for the State to fully implement the erosion area setbacks required in the Rules on Coastal Zone Management.
- 3) Strengthen the county enabling legislation and develop an interagency agreement in order to effect transference of the administrative requirements of CAFRA from DEPE to the Ocean County Planning Board. (see Action Plan #2.2)

Completion of any of the above legislative actions will provide for more thorough environmental protection while achieving interagency consistency and providing more regulatory authority on the local level.

Action Plan #4.19	Promote removal or relocation of residential structures in imminent danger of collapse due to erosion.
Rationale	Existing structures which are threatened by erosion are eligible for relocation assistance through the federal flood insurance program. Use of this funding provides an alternative to armoring shorelines.
Lead Responsibility	N.J. Department of Environmental Protection and Energy to identify erosion hazard areas and revise applicable policies to support relocation and adoption of setbacks (see Action Plan #4.18)
Cooperating Parties	Federal Emergency Management Agency to provide financial assistance
Resources	The Upton-Jones funding available under the National Flood Insurance Program provides monies for the removal or relocation of structures threatened with immediate collapse due to erosion.
Required Legislation	None



Objective 9 **Maintain navigation channels to facilitate recreational boating and minimize environmental disturbance.**

Action Plan #4.20 **Prohibit prop-wash dredging in Barnegat Bay.**

Rationale Prop-wash dredging, which does not remove accumulated sediments from an area but disperses it into the water column, is not an acceptable practice under any circumstances. This practice may accelerate the silting of adjacent areas, resuspend contaminated sediments, add to the turbidity of the Bay, bury immobile benthic organisms such as clams, and suffocate other aquatic species.

Lead Responsibility 1) N.J. Department of Environmental Protection and Energy (DEPE), should revise the dredging policies in the Rules on Coastal Zone Management (N.J.A.C. 7:7E 1.1 et seq.) to be consistent with this action plan.
2) Municipalities should adopt ordinances which are consistent with this action plan.

Cooperating Parties DEPE, Land Use Regulation Program

Resources This can be accomplished with existing resources.

Required Legislation Municipalities need to adopt ordinances which are consistent with this action plan.

**Action Plan
#4.21A**

Preserve adequate dredged material disposal sites through acquisition for use in perpetuity.

**Action Plan
#4.21B**

Reuse material in dredge spoil disposal sites for beach fills, construction fill or daily landfill cover, as may be appropriate, to renew the capacity of those sites.

Rationale

Maintenance dredging of the existing navigation channels in Barnegat Bay is necessary to facilitate the movement of vessels in and through the Bay. Therefore, dredged spoil disposal sites need to be preserved and their capacity periodically renewed. Dredge spoils are a renewable resource that should be marketed as a construction or beach fill material.

**Lead
Responsibility**

N.J. Department of Environmental Protection and Energy, Construction and Engineering Element

**Cooperating
Parties**

Tidelands Resource Council to sell material at reasonable cost.

Resources

Funding is needed to acquire privately owned dredged material disposal sites.

**Required
Legislation**

None

**Action Plan
#4.22**

Encourage the use of former dredge material disposal sites for future disposal use provided that:

- a) The site has existing dikes in sound condition or is suitable for the construction of structurally sound dikes**
- b) There are no anticipated adverse effects to threatened or endangered species**
- c) There are no colonial nesting birds present on-site which would be adversely effected**
- d) The former spoil has not subsided to a tidally influenced elevation and does not support Spartina spp**
- e) No coastal wetland would be adversely affected**
- f) No mature wetland habitats would be adversely affected.**

Rationale

The use of dredge spoil disposal sites is important to the maintenance of navigation channels and should be available for dredged material disposal. This availability should not be limited due to freshwater wetlands created within the diked spoil containment area.

**Lead
Responsibility**

- 1) N.J. Department of Environmental Protection and Energy (DEPE), should revise the dredge disposal policy in the Rules on Coastal Zone Management to be consistent with this action plan.
- 2) Municipalities should adopt ordinances which are consistent with this action plan.

**Cooperating
Parties**

- 1) DEPE, Land Use Regulation Program for implementation of rule amendments
- 2) DEPE, Engineering and Construction Element and U.S. Army Corps of Engineers to comply with rule amendments when disposing of dredged material

Resources

This can be accomplished with existing resources.

**Required
Legislation**

Municipalities should adopt ordinances which are consistent with this action plan.

Objective 10 **Manage existing and proposed boating facilities to reduce boating impacts on the water quality of Barnegat Bay.**

Action Plan #4.23A **Require all marinas to provide portable toilet emptying facilities.**

Action Plan #4.23B **Require all marinas and launching sites to provide adequate shoreside restroom facilities.**

Action Plan #4.23C **Require all boating facilities to provide and maintain solid waste receptacles or source separation of solid waste.**

Action Plan #4.23D **Require all marinas of 25 or more slips to provide pumpout facilities for Type III marine sanitation devices (no discharge systems), unless it is demonstrated that no slip can accommodate a vessel greater than 20 feet in length or that an adequate number of pumpout facilities exist within .5 miles of the marina.**

Rationale The intentional overboard discharge of solid waste and sewage from recreational boats is a problem on Barnegat Bay. For instance, Type III marine sanitation devices, or holding tanks, are designed to be no discharge systems. These holding tanks require periodic pumping to empty the tank. The general lack of pumpout facilities has resulted in many of these tanks being retrofitted with a through-hull "y" valve, which allows the discharge of untreated sewage into the water. This discharge has an adverse impact on both the natural resources and the users of Barnegat Bay. This plan recommends increasing the opportunities for proper disposal of these and other wastes and increased enforcement to compel compliance with existing regulations. Areas where large numbers of boats are congregated at a days end destination such as marinas and boat launching sites are appropriate places for providing those opportunities. In many cases these same businesses are dependent upon a clean Barnegat Bay to attract customers; therefore, they have a vested interest in protecting the Bay.

Lead Responsibility N.J. Department of Environmental Protection and Energy (DEPE), Land Use Regulation Program to revise the Rules on Coastal Zone Management to reflect the above action plan

Cooperating Parties

- 1) DEPE, Land Use Regulation Program for implementation of rule amendments
- 2) Utilities authorities to accept pumpout hookups to sanitary systems without an undue increase in sewer rates

Resources

No public monies needed

Required Legislation

None



**Action Plan
#4.24**

Require any marina which is documented to be causing water quality degradation due to overboard discharge of sewage and which provides dockage to live-aboard vessels to submit an enforcement plan to the N.J. Department of Environmental Protection and Energy (DEPE) to eliminate illegal discharges. This may include the required use of dye tablets or expulsion of offending parties. If the problem persists, the DEPE may require the marina to install a slipline pumpout connection to each slip where live-aboards are allowed or discontinue live-aboard use of vessels docked at that marina. Live-aboard vessels shall be prohibited at any slip that is not directly connected to the sewage pumpout system, with the exception of transient vessels. Transient vessels shall not be docked at the marina in excess of two consecutive days, unless seeking refuge from inclement weather. Live-aboard vessels shall be defined as any vessel occupied overnight.

Rationale

The discharge of sewage from several vessels in a concentrated area, such as a marina, results in fecal coliform contamination of the water in the vicinity of those vessels due to insufficient dilution. This contamination makes water unsanitary for swimming and also results in the closure of shellfish beds. The goal of this action plan is to make the marina owner a partner in the effort to eliminate illegal sewage discharges from vessels. The marina owner, under this strategy, would have a vested interest in the protection of water quality in and around the marina basin when faced with the possibility of having to install a slipline pumpout system which can cost in excess of \$10,000.

**Lead
Responsibility**

DEPE, Science and Technical Programs, Bureau of Monitoring Management should sample water quality in the vicinity of marinas suspected of causing water quality degradation due to overboard discharge of sewage. This is necessary to document a water quality problem which would necessitate implementing this action plan.

**Cooperating
Parties**

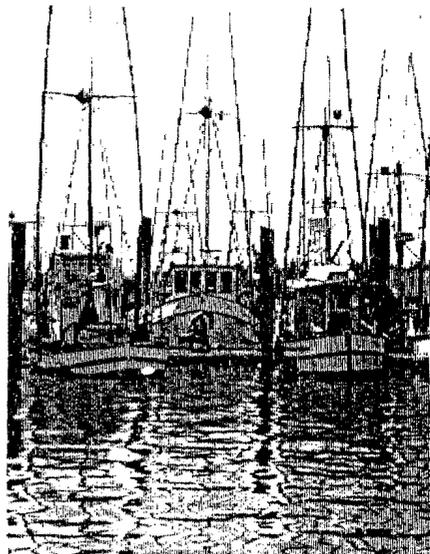
Once water sampling has documented overboard discharges, DEPE, Enforcement should issue an order to eliminate all live-aboard use at the marina or provide slipline pumpout access to each live-aboard slip at the marina.

Resources

This can be accomplished with existing resources.

**Required
Legislation**

None required, this action can be accomplished under the authority granted to the DEPE by P.L. 1988, c. 117.



**Action Plan
#4.25**

Provide funding for pumpout facility placement at private marinas. (See Report to the State Legislature required by P.L.1988 c.117: The Availability of and Demand for Sanitary Sewage Handling Facilities on New Jersey's Coastal Waters and Addendum prepared by the N.J. Department of Environmental Protection and Energy (DEPE) for additional information.)

Rationale

Funding for pumpout facilities would enable the State to ensure public availability, and a reasonable fee for use. This mechanism would also allow the State to control the locations of facilities such that unnecessary facilities are not required.

**Lead
Responsibility**

- 1) N.J. State Legislature should appropriate funding for this effort or approve a funding mechanism such as that proposed by Action Plan #4.13C. This would recapture that portion of the motor fuel tax attributable to recreational boating for use to support the maintenance of navigation channels and the installation of pumpout facilities. Revenue generated by boating would then be used to support safer and environmentally sound boating.
- 2) DEPE, Office of Land and Water Planning should administer allocation once funds become available

**Cooperating
Parties**

None

Resources

A funding source will be required to implement this action plan.

**Required
Legislation**

The N.J. Legislature must appropriate funds for this purpose or approve a funding mechanism.

**Action Plan
#4.26**

Provide public pumpout facilities at the abutments of the Mantoloking Bridge and other appropriate bridges when they are replaced.

Rationale

The Mantoloking Bridge is a concentration point for much of the vessel traffic in northern Barnegat Bay. Many vessels from the Metedeconk River area and vessels exiting or entering the Point Pleasant Canal pass beneath this structure. The placement of pumpout facilities at this location would be convenient for many vessels operating in Barnegat Bay. If and when the bridge is replaced, the existing bridge abutments would provide a logical site for the placement of pumpout facilities due to the presence of ready access to both sewers and deep water. The cost of providing pumpout facilities would be nominal when compared to the cost of a new bridge. Other bridges along tributaries to the Barnegat Bay may provide similar, cost effective, opportunities for pumpout placement.

**Lead
Responsibility**

N.J. Department of Environmental Protection and Energy (DEPE), Office of Land and Water Planning to research funding sources and negotiate with N.J. Department of Transportation (DOT)

**Cooperating
Parties**

None

Resources

Purchase and installation of two pumpout facilities at the Mantoloking Bridge would cost under \$20,000 (1991 dollars). Possible sources of funds are Wallop-Breaux funds from the DEPE Division of Fish, Game and Wildlife, federal grant money from either the U.S. Environmental Protection Agency, or the National Oceanic and Atmospheric Administration, or largesse from the DOT

**Required
Legislation**

None

**Action Plan
#4.27**

Apply to the U.S. Environmental Protection Agency for a Bay-wide "no discharge" designation.

Rationale

The Barnegat Bay is the largest back bay in New Jersey, but it is relatively poorly flushed. Therefore, pollutants released into the Bay take longer to dilute to harmless levels. The Barnegat Bay also provides both shellfishing and primary contact recreation opportunities. To reduce the potential for illness from fecal borne diseases, the Bay should be designated as a "no discharge area".

**Lead
Responsibility**

N.J. Governor's Office for formal application

**Cooperating
Parties**

N.J. Department of Environmental Protection and Energy, Office of Land and Water Planning to draft the application

Resources

Can be accomplished with existing resources

**Required
Legislation**

None. Authority is provided under Section 312 of the Federal Water Pollution Control Act (Clean Water Act).

**Action Plan
#4.28**

Provide increased enforcement of regulations related to litter and overboard discharge of sewage. Expand citizens reporting program initiated for MARPOL Annex V enforcement to include sewage discharges.

Rationale

MARPOL Annex V, an international treaty for reduction of marine pollution, bans plastic disposal at sea and regulates the disposal of other types of garbage. Currently, citizen reporting programs coordinated by the New Jersey Sea Grant Marine Advisory Service/New Jersey Sea Grant Project focus on debris other than sewage. Expansion of this program would more comprehensively address marine pollution and would complement the activities of the Marine Police.

**Lead
Responsibility**

- 1) N.J. Legislature
- 2) N.J. State Police, Bureau of Marine Law Enforcement
- 3) N.J. Sea Grant Marine Advisory Service/N.J. Sea Grant Program

**Cooperating
Parties**

- 1) Local law enforcement officials
- 2) N.J. Department of Environmental Protection and Energy enforcement personnel
- 3) U.S. Coast Guard
- 4) Citizens

Resources

Additional enforcement personnel are needed to improve the effectiveness of these laws. (see Action Plan #4.8)

**Required
Legislation**

Authority for litter control and overboard discharge enforcement is provided by the Litter Law, (N.J.S.A. 13:1E-99.3) and the Fish and Wildlife Statutes (N.J.S.A. 23:5-28). Enforcement actions based on citizen reporting will require new legislation.

**Action Plan
#4.29**

Provide for a marina inspection program administered by the Ocean County Health Department to ensure that provisions related to pumpout facilities, portable toilet dumping stations, shoreside restroom facilities and fuel spill contingency plans are met and to provide for periodic inspection of the required facilities.

Rationale

Several marinas have been required to install pumpout facilities and shoreside restroom facilities through N.J. Department of Environmental Protection and Energy's (DEPE) coastal permitting program. However, enforcement of these requirements has been lax due to insufficient personnel. A regular inspection program is needed to insure that the facilities are installed, are operational and are available to the boating public.

**Lead
Responsibility**

The N. J. Legislature to establish a marina inspection program

**Cooperating
Parties**

- 1) DEPE for program development
- 2) Ocean County Health Department for program implementation

Resources

Ocean County Health Department will probably need funding to perform this function. Nominal inspection fee could offset costs incurred.

**Required
Legislation**

Legislation would be required to establish this inspection program.

**Action Plan
#4.30A**

Develop a model fuel spill contingency plan for marinas which provide fueling facilities. (see September 3, 1990 New Jersey Register)

**Action Plan
#4.30B**

Petition the National Fire Protection Association to amend the Fire Protection Standard for marinas and boatyards to allow back-pressure shutoff nozzles on vessel fueling stations and to remove any device which would allow the nozzle to pump fuel while unattended.

**Action Plan
#4.30C**

Recommend that all new vessels be equipped with a device that would prevent fuel escape through the filling vent into the water. Encourage the use of whistles on fill tubes to alert the gasoline attendant that the tank is nearing capacity.

Rationale

The potential for a fuel spill exists with nearly every power vessel. However, the potential is greatest at dockside fueling stations. Such a spill may result from overfilling onboard tanks, or from pipeline and tank leaks. These facilities should have an approved contingency plan such that in the event of a spill, personnel will be able to quickly and safely confine the spill, thereby reducing its environmental impact. Such a plan needs to be well thought out in terms of the volatility of most motor fuels. These fuels may vaporize quickly, making containment booms unnecessary. In fact, booming these highly flammable fuels may increase the risk of fire or explosion at the marina. Guidance from the U.S. Coast Guard and N.J. Department of Environmental Protection and Energy (DEPE) Emergency Response is needed to develop a sound model spill contingency plan for marinas.

Currently the National Fire Protection Association (NFPA) does not allow the use of back-pressure shutoff nozzles at marina fueling facilities. These nozzles are employed at nearly all automotive fueling stations to reduce the incidence and volume of accidental spills due to overfilling. Self service stations in Pennsylvania are required to remove devices that allow the nozzle to remain engaged while unattended. Applying this requirement in New Jersey marinas would eliminate the apparent concern of the NFPA that fuel pumping will go unattended. The employment of these nozzles could also effectively reduce accidental spills from overfilling.

Technology is currently available to eliminate the escape of fuels through vent tubes into the water during vessel fueling. This technology should be incorporated into all new vessels. Similarly, whistles are available which alert

the gasoline attendant that the tank is full, thereby reducing the likelihood of spills due to overfilling. The use of these whistles should be encouraged on all vessels with a fixed fuel tank.

**Lead
Responsibility**

DEPE, Office of Land and Water Planning to develop the model

**Cooperating
Parties**

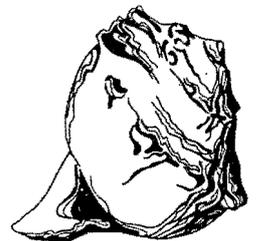
DEPE Emergency Response and the U.S. Coast Guard for technical advice

Resources

This can be accomplished with existing resources.

**Required
Legislation**

None



**Action Plan
#4.31**

Marinas should implement pollution prevention plans addressing the siting, design and operation and maintenance of the facility. The plans should be comprehensive and address both point and nonpoint sources associated with the marina. Technical guidance should be provided by State agencies. Nonpoint source management measures for marinas as proposed by the U.S. Environmental Protection Agency are described in Appendix 18.

Rationale

Many marinas and boat yards are subject to the new stormwater permitting program to be implemented through the New Jersey Pollutant Discharge Elimination System permit program. The deadline for applying for a permit has been postponed to October, 1992. The N.J. Department of Environmental Protection and Energy (DEPE) most likely will address many industrial facilities, including marinas, through a general permit calling for pollution prevention plans. Since marinas are frequently in the water or at the water's edge, urgent attention should be given to helping these facilities comply with the permitting requirements.

**Lead
Responsibility**

- 1) DEPE to do research and develop guidelines
- 2) Barnegat Bay Study Area marinas to provide feedback during guidelines development and to adopt individualized plans

**Cooperating
Parties**

- 1) N.J. Sea Grant Advisory Service
- 2) N.J. Marine Trades Association

Resources

Funding may be required to support technical advisory staff

**Required
Legislation**

None

CHAPTER V: FISHERIES MANAGEMENT

Introduction

Like all estuaries within New Jersey, Barnegat Bay is a complex, nutrient-rich system which supports a variety of commercial and recreational fisheries. A number of marine species, including fluke, bluefish, weakfish, menhaden and spot utilize the Bay as a nursery area. Hard clams and blue crabs support important recreational and commercial fisheries throughout the year. The varied Bay habitat, including tributaries, intertidal and subtidal shallows, and submerged aquatic vegetation, is a key factor in the productivity of Barnegat Bay.

Although it is an extremely productive environment, Barnegat Bay is vulnerable. The organisms of the Bay must be adaptable to an ever changing environment - both natural and anthropogenic. Human-made alterations to the Bay ecosystem are prevalent here due to the large population of the Barnegat Bay watershed and its popularity as a vacation site. Dredging, filling, bulkheading and various types of upland development have a significant impact on the vitality of the Bay. Another source of anthropogenic impacts on the Bay is the Oyster Creek Nuclear Generating Station on Oyster Creek in Lacey Township. A study of the impacts of the plant states that "the potential adverse effects of the thermal discharges on the Barnegat Bay ecosystem were determined and found to be localized and to have few or no regional consequences." The primary impact of the plant was found to be entrainment of fish and other organisms in the cooling system. It is recommended that a study be done to identify methods to mitigate the effects of the plant. Since most major marine fisheries are dependent upon estuaries for their continuation, every effort must be made to preserve and enhance the ecological integrity of Barnegat Bay.

While Barnegat Bay supports a great abundance of fisheries resources, there are no species unique to the Bay which would warrant the development of management plans specifically for Barnegat Bay species. However, important commercial and recreational species will be addressed in this chapter, including a discussion of current regulations and proposed management measures designed to reduce both adverse impacts to the resource as well as user conflicts. Although discussed in this section, Shellfish Habitat and Anadromous Fish Spawning Runs have been addressed in detail in the Sensitive Areas Plan.

In summary, the fisheries resources of Barnegat Bay provide a multi-million dollar boost to the state's economy in the form of recreational dollars expended and the value of the commercial harvest. While additional data and regulations are needed for effective management, it is generally agreed that the fisheries resources of Barnegat Bay would benefit most via measures to preserve valuable habitat (e.g., sensitive areas such as submerged vegetation, intertidal and subtidal shallows, wetlands, etc.) and improve water quality.

Major Fisheries Resources of Barnegat Bay

Hard clams, blue crabs, winter flounder and American eels comprise the major commercially-harvested species within the Bay. Landing statistics compiled by the National Marine Fisheries Service indicate that the 1988 catch of hard clams, blue crabs, white perch and American eels reported for Ocean County represented approximately 26% of the state total catch for these species.

HARD CLAMS

The hard clam is the most valuable shellfish species harvested both commercially and recreationally in Barnegat Bay. The value of the 1990 Ocean County hard clam landings was approximately \$1,214,487, which represented approximately 29% of the total value of hard clams landed statewide. Although harvest figures are not available, recreational clamming also supports economically significant fisheries and related activities in the Bay. A review of hard clam landings (Table 4) for Ocean County, which includes Barnegat and Little Egg Harbor Bays, indicates a significant decline in reported landings since 1960. However, harvest figures have been fairly stable for the last ten years. A survey of recreational and commercial shellfishermen indicated a 43% increase in shellfishing activity between 1978 and 1980, so some portion of the declining harvest figures may be due to intense fishing pressure on the resource.

The distribution and relative abundance of hard clams within Barnegat Bay has remained fairly consistent over the last 30 years. Data collected by the N.J. Bureau of Shellfisheries in 1985 shows remarkable correspondence to shellfish distribution charts prepared by the U.S. Fish and Wildlife Service in 1963 (Distribution of Shellfish Resources in Relation to the New Jersey Intracoastal Waterway). Both surveys indicate virtually no hard clam resource north of Cedar Creek (see figure 5), with the southern half of the Bay containing beds of only recreational or moderate commercial value. Although increased shellfishing activity may have resulted in lower catch per effort figures over time, the corroboration of these two surveys indicates that the distribution and relative abundance of hard clam stocks within the Bay has changed very little since 1960.

The hard clam industry of New Jersey has received additional benefit from Barnegat Bay in that it has served as a transplanting site for naturally depurating hard clams harvested from marginally polluted waters of Monmouth County. Sixty six acres of bottom between Swan Point and Sloop Point in northern Barnegat Bay have been leased to commercial shellfishermen participating in the state-sanctioned relay program. From 1980-1989, 30 million clams were transplanted onto the Swan Point lots. Approximately 60 shellfishermen participating in the program relayed 8.1 million clams to Swan Point in 1990 and 8.4 million in 1991. Unfortunately, declining water quality resulting from nonpoint source pollution in this area led to a decision in February 1992 to relocate these relay lots to cleaner waters. The new relay site

will be selected after careful consideration of a variety of environmental and logistical factors and will most likely be situated between Cedar Creek and Forked River.

Water quality and habitat protection are crucial to the continued viability and harvest of the hard clam resource of Barnegat Bay. To this end, specific protection needs for shellfish habitat and hard clam relay beds have also been included in the Sensitive Areas Protection section of the plan.

BLUE CRABS

Another species which is one of the most important both recreationally and commercially is the blue crab. Although harvest figures are not available, recreational crabbing supports economically significant fisheries and related activities in the Bay. Commercial landings of blue crabs for Ocean County are listed in Table 5 for both the winter dredge and summer pot fisheries from 1981 to 1990. Blue crab landings from both fisheries have been variable during the ten year period. Annual landings from the dredge fishery were less than 20,000 pounds from 1981 through 1984, increased to a high of 454,620 pounds in 1988, and then decreased to 136,880 pounds in 1990. Average annual landings during the ten year period were 115,906 pounds.

Reported blue crab landings from the pot fishery averaged 356,383 pounds per year during the ten year period from 1981 to 1990. Except in 1984, annual landings were less than 200,000 pounds from 1982 to 1986 and increased to a high of 847,835 pounds in 1989. In 1990, reported landings totalled 495,395 pounds. Total landings of blue crab in Ocean County typically constitute 10-15 % of total state blue crab landings.

Current Management

Blue crabs are currently managed statewide through a system of size limits, gear restrictions, area closures and seasons. A summary of existing regulations include:

- 1) Blue crabs can be harvested commercially by crab pot, trot line and dredge.
- 2) All commercial fishermen must be licensed.
- 3) All commercial gear is defined by regulation.
- 4) Commercial crabbers cannot fish in creeks less than 25 feet in width, in marked channels or other areas where navigation is impeded.
- 5) No season has been established for potting or trot lining. The dredge season in Barnegat Bay is December 1 through March 31.

- 6) Possession size limits are three inches for shedder crabs, three and one-half inches for soft crabs and four inches for hard crabs.
- 7) Egg bearing females cannot be kept.
- 8) Recreational crabbers are not licensed for collapsible traps and hand lines, but a free license can be issued to fish no more than two commercial crab pots.

Table 4

National Marine Fisheries Service
Commercial Landings in Ocean County
Hard Clam Landings (lbs.) and Ex-Vessel Value (dollars)

<u>Historical Perspective</u>			<u>Recent Trend</u>		
Year	Reported Landing	Value	Year	Reported Landing	Value
1960	1,172,200	\$415,039	1981	498,000	\$1,088,201
			1982	550,000	\$1,354,988
1965	1,108,300	\$508,942	1983	668,000	\$1,646,637
			1984	699,000	\$2,124,152
1970	1,400,000	\$838,256	1985	533,300	\$1,659,232
			1986	620,000	\$2,036,918
1975	967,400	\$986,269	1987	587,000	\$2,234,965
			1988	564,000	\$2,143,265
1980	486,700	\$974,810	1989	462,000	\$1,753,839
			1990	347,620	\$1,223,147
Mean	1,027,080		Mean	522,892	

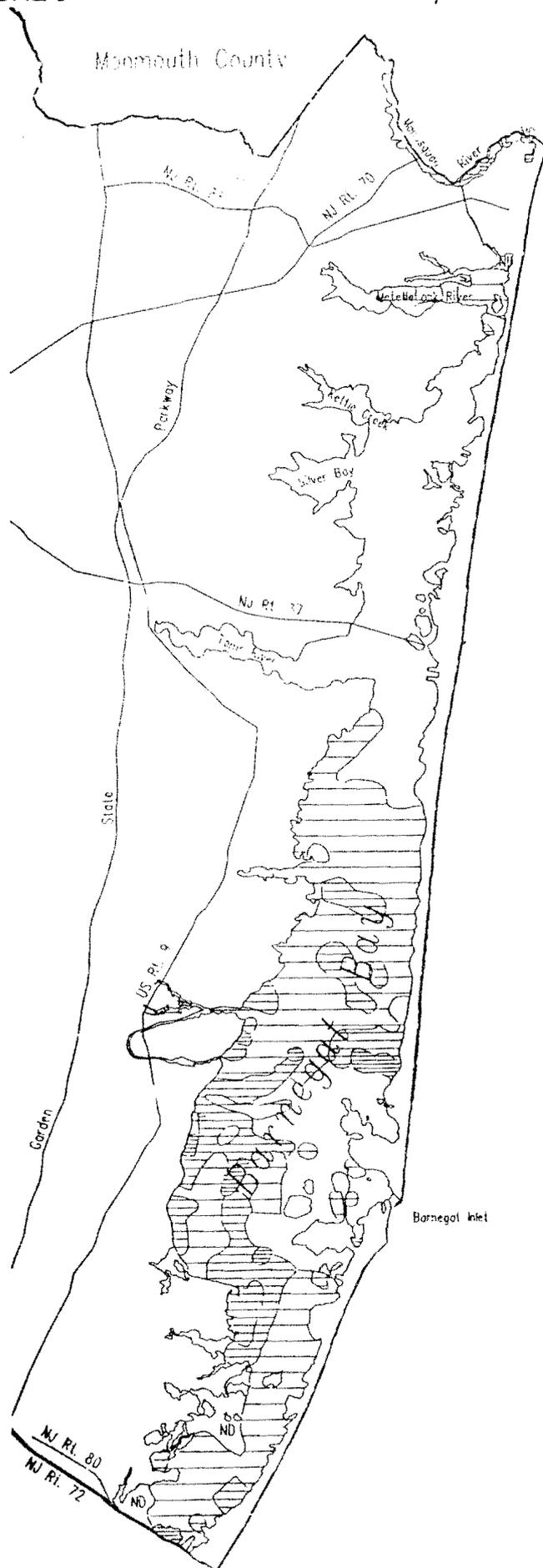
FIGURE 5

Hard Clam Beds

LEGEND

-  None
-  Occurrence
-  Moderate
-  High
-  No data

Source: NJDEP GIS



WINTER FLOUNDER

Winter flounder represent another important commercial and recreational fishery within Barnegat Bay, although commercial landings for this species are significantly lower than hard clams or blue crabs. Winter flounder utilize virtually all of Barnegat Bay and its tributaries as spawning and nursery areas. Commercial landings of winter flounder taken by fyke net in Ocean County from 1981 to 1990 are listed in Table 6. During the ten year period, the average annual reported landings was 17,919 pounds, with a high of 30,533 pounds (1985) and a low of 5,935 pounds (1989). Winter flounder also support a significant spring and fall recreational fishery in Barnegat Bay.

Current Management

Winter flounder are currently managed through a system of size limits, gear restrictions and seasons. A summary of existing regulations include:

- 1) Winter flounder can be harvested commercially by fyke net and otter trawl.
- 2) All commercial fishermen must be licensed.
- 3) Trawling is illegal within two miles of the coast.
- 4) All commercial gear is defined by regulation.
- 5) The fyke net season in Barnegat Bay is November 1 through April 30.
- 6) Possession size limit for winter flounder is ten inches.

AMERICAN EEL

The American eel spawns in the Sargasso Sea and completes its growth to sexual maturity in the coastal waters of the east coast of the United States. This species is harvested commercially in Barnegat Bay primarily via the use of baited pots. Most commercial landings in Barnegat Bay occur from April through June, with catches declining through the fall. Commercial landings of American eels taken by eel pots in Ocean County from 1981 to 1990 are listed in Table 6. The average annual landings during the ten year period were 53,069 pounds. Landings have decreased steadily from a high of 96,860 pounds in 1983 to 20,700 pounds in 1990.

Current Management

American eels are currently managed statewide through a system of gear restrictions and seasons. A summary of existing regulations include:

- 1) American eels can be harvested commercially by miniature fykes (eel pots).
- 2) All commercial fishermen must be licensed.
- 3) All commercial gear is defined by regulation.
- 4) The season for commercial eel potting in Barnegat Bay is January 1 to December 31.
- 5) Recreational fishermen can fish two eel pots without a license. Eels so taken cannot be sold.

ALEWIFE AND BLUEBACK HERRING

Alewife and blueback herring are important forage species found along New Jersey's coast. They play an important role in the food web, occupying an intermediate level between zooplankton and piscivores. Both species are of importance as a human food source and are often harvested for live bait for bluefish and striped bass fishing. In Barnegat Bay, these species are harvested primarily as a recreational species, although there may be a limited commercial harvest as a by-catch, or unintentional capture, of fyke netting operations. Consequently, there are no reported landings for these species from the National Maritime Fisheries Service.

Alewife and blueback herring are also discussed in the Sensitive Areas chapter, including management measures designed to protect anadromous fish spawning runs.

Current Management

A summary of existing regulations include:

- 1) Cast nets can be used up to 16 feet in diameter with no license or up to 30 feet in diameter with a bait net license to harvest alewife and blueback herring.
- 2) The maximum number of herring allowed to be harvested per day is 35.

AQUACULTURE

The N.J. Department of Environmental Protection and Energy (DEPE) currently promotes private aquaculture activities via the leasing of Bay bottom for shellfish culture. Statewide, approximately 32,000 acres of bay bottom are currently leased by commercial shellfishermen, primarily for the culture of oysters and hard clams, although the majority of this leased acreage is along the Delaware Bay. Approximately 3,400 acres are leased along the state's Atlantic coast, with approximately 66 acres leased in Barnegat Bay. These parcels are used to grow hatchery-reared clams and oysters to market size or as "wet storage" areas to hold shellfish prior to harvesting them for market. The development of aquaculture within New Jersey will continue through the cooperative efforts of DEPE, private shellfish hatcheries, and individual shellfishermen. In addition, the DEPE is currently investigating the feasibility and efficacy of planting crushed shell as a means of habitat enhancement.

Table 5

National Marine Fisheries Service
Ocean County
Landings (Lbs) and Ex-Vessel Value (dollars)

Year	Dredge (lbs)	Blue Crabs		
		Value	Pot (lbs)	Value
1981	18,160	\$ 9,278	376,880	\$128,824
1982	0	\$ 0	133,529	\$ 50,902
1983	12,720	\$ 7,072	161,432	\$ 72,799
1984	0	\$ 0	354,175	\$141,224
1985	28,880	\$ 12,720	170,383	\$ 90,535
1986	49,000	\$ 21,643	170,818	\$ 83,896
1987	178,620	\$ 81,992	221,373	\$112,287
1988	454,400	\$221,680	632,008	\$300,354
1989	280,400	\$124,420	847,935	\$404,454
1990	136,880	\$ 70,550	495,395	\$222,698
Mean	115,906		356,383	

Table 6

Year	American Eels		Winter Flounder	
	Eel Pot (lbs)	Value	Fyke Net (lbs)	Value
1981	32,385	\$22,988	23,540	\$ 8,813
1982	68,620	\$52,296	25,923	\$11,260
1983	96,860	\$81,810	32,620	\$13,763
1984	82,860	\$66,290	23,200	\$ 9,236
1985	56,570	\$36,982	30,533	\$14,596
1986	50,020	\$43,928	15,930	\$11,581
1987	43,360	\$41,602	7,373	\$ 6,561
1988	40,885	\$57,289	7,140	\$ 5,962
1989	38,450	\$62,857	5,935	\$ 4,722
1990	20,700	\$34,425	7,000	\$ 5,680
Mean	53,069		17,919	

Action Agenda

The action steps outlined in the chapter are organized by fisheries objectives as follows:

- 1) Reduce user conflicts relevant to the blue crab fishery.
- 2) Enact regulations relevant to the blue crab fishery to further protect resources of Barnegat Bay.
- 3) Obtain additional information on the winter flounder populations of Barnegat Bay and amend regulations to further protect this species.
- 4) Obtain additional data relevant to the American eel fishery and amend existing regulations for better management of the resource.
- 5) Maintain the viability and harvest of the hard clam resource of Barnegat Bay.
- 6) Protect anadromous fish spawning runs within the Barnegat Bay watershed.

Objective 1	Reduce user conflicts relevant to the blue crab fishery.
Action Plan #5.1A	Sell commercial licenses for crab potting during January, February and March only.
Action Plan #5.1B	Establish a crab potting season.
Action Plan #5.1C	Establish a maximum number of crab pots each commercial fishermen is allowed to set.
Action Plan #5.1D	Increase the minimum width of creek size allowed to be potted from 25 feet to 50 feet.
Rationale	<p>This is proposed to stabilize license sales which will reduce conflicts with user groups in the Bay and prevent overfishing of the crab resource. Crab potters would no longer have the choice of waiting to assess the condition of the fishery before buying a license. Each crabber would have to decide during the first three months of each year if they are going to participate in the fishery.</p> <p>Establishing a season would prevent setting of pots before it is practical to pot crabs for the sole purpose of establishing a crabbing area and should also reduce the problem of abandoned or lost fishing gear. Limiting the setting of crab pots will avoid trapping of terrapins and minimize damage to recreational boaters. After the season is closed, all pots remaining in the water will be automatically illegal and can be removed by law enforcement authorities.</p> <p>This proposal would reduce conflicts between recreational fishermen, boaters and commercial crabbers.</p> <p>Increasing creek size may reduce conflicts between recreational fishermen, boaters and commercial crabbers. Avoiding smaller creeks may also reduce the by-catch, or unintentional capture, of diamondback terrapins, which would benefit the terrapin resource.</p>
Lead Responsibility	The N.J. Department of Environmental Protection and Energy, Division of Fish, Game and Wildlife, the agency

responsible for fishing licenses, should initiate revisions of commercial crab licensing, crabbing practices and management regulations.

Cooperating Parties

Technical assistance may be required from the N.J. Sea Grant Marine Advisory Services.

Resources

No additional resources required

Required Legislation

None



Objective 2	Enact regulations relevant to the blue crab fishery to further protect resources of Barnegat Bay.
Action Plan #5.2	Require all baited crab pots to have two cull rings, the size of which should be determined by field studies and literature review.
Rationale	A cull ring is a size selective escape port which allows undersized crabs to leave a crab pot. Requiring cull rings on all crab pots should reduce the capture of small, illegal crabs. This will reduce culling time and reduce the fishing effectiveness of lost or abandoned gear. This requirement would not pertain to non-baited peeler pots.
Lead Responsibility	The N.J. Department of Environmental Protection and Energy (DEPE), Division of Fish, Game and Wildlife should initiate a field search and literature review to determine the required size of cull rings.
Cooperating Parties	Technical assistance in this study may be required by the following parties: 1) DEPE, Land Use Regulation Program 2) N.J. Sea Grant Marine Advisory Service
Resources	Funding will be required to undertake field studies and literature review to determine the proper size of cull rings. Possible sources of funding include: 1) Permit fees for coastal development 2) Annual fee for coastal development having direct impact on Bay ecology 3) Mitigation fees for violations 4) User fees a) boat operators license b) boat registration fee c) commercial harvester fee
Required Legislation	None

**Action Plan
#5.3**

Require all crab pots to have non-galvanized or non-stainless hog rings or other fasteners on at least one side of the pot.

Rationale

This proposal would reduce the fishing effectiveness of lost gear (ghost pots) by ensuring that fasteners on one panel of the pot would corrode and render the pot unfishable.

**Lead
Responsibility**

Revisions of crabbing regulations should be initiated by the N.J. Department of Environmental Protection and Energy (DEPE), Division of Fish, Game and Wildlife.

**Cooperating
Parties**

Technical assistance may be required from the following parties:

- 1) DEPE, Land Use Regulation Program
- 2) N.J. Sea Grant Marine Advisory Service

Resources

No additional funding will be required

**Required
Legislation**

None

**Action Plan
#5.4**

Establish all submerged aquatic vegetation (SAV) areas as sensitive areas and prohibit dredging to protect vegetation.

Rationale

SAV areas are important fish feeding and spawning habitats. Establishing these areas as sensitive sites and limiting activity within them will help control environmental damage and offer additional protection to these sensitive habitats.

**Lead
Responsibility**

The N.J. Department of Environmental Protection and Energy (DEPE), Division of Fish, Game and Wildlife should initiate the identification and mapping of SAV areas within the Barnegat Bay. This activity should be coordinated with mapping efforts recommended in Action Plans #4.13 & #7.10

**Cooperating
Parties**

Technical assistance may be required from the following agencies:

- 1) DEPE, Land Use Regulation Program
- 2) N.J. Sea Grant Marine Advisory Service

Resources

Additional resources may be necessary for identification and mapping of SAV beds. Possible sources of funding include:

- 1) Permit fees for coastal development
- 2) Annual fee for coastal development having direct impact on Bay ecology
- 3) Mitigation fees for violations
- 4) User fees
 - a) boat operators license
 - b) boat registration fee
 - c) commercial harvester fee

**Required
Legislation**

None

**Action Plan
#5.5**

Require all commercial crab pot and dredge licenses sold to indicate their use in Barnegat Bay.

Rationale

Information gathered from commercial fisherman would be a valuable and inexpensive data set to assist the State in its efforts to monitor the vitality of the crab population and assess the level of fishing effort.

**Lead
Responsibility**

The N.J. Department of Environmental Protection and Energy (DEPE), Division of Fish, Game and Wildlife should initiate the creation of a crabbing survey as an attachment to a commercial license application.

**Cooperating
Parties**

Technical assistance may be required from the following agencies:
1) DEPE, Land Use Regulation Program
2) N.J. Sea Grant Marine Advisory Service

Resources

No significant additional monies required

**Required
Legislation**

None

**Action Plan
#5.6**

Conduct a survey of commercial and recreational crabbers to gather data on the blue crab fishery within Barnegat Bay.

Rationale

Bay fishermen can provide current and diverse data on the yield, health and population of the crab population.

**Lead
Responsibility**

The N.J. Department of Environmental Protection and Energy (DEPE), Division of Fish, Game and Wildlife should design and administer a crab survey.

**Cooperating
Parties**

Technical assistance in designing a survey may be required from the following agencies:

- 1) DEPE, Land Use Regulation Element
- 2) N.J. Sea Grant Marine Advisory Service

Assistance in administering a survey may be required from:

- 1) Marinas
- 2) Bait shops

Resources

Additional funding is required to compile survey results.

Possible sources of funding include:

- 1) Permit fees for coastal development
- 2) Annual fee for coastal development having direct impact on Bay ecology
- 3) Mitigation fees for violations
- 4) User fees
 - a) boat operators license
 - b) boat registration fee
 - c) commercial harvester fee

**Required
Legislation**

None

Objective 3	Obtain additional information on the winter flounder populations of Barnegat Bay and amend regulations to further protect this species.
Action Plan #5.7A	Define, by field studies and literature review, all winter flounder spawning areas and times.
Action Plan #5.7B	Prohibit dredging in areas where winter flounder spawning takes place to protect adhesive, demersal eggs and bottom associated larvae. Areas probably include all of Barnegat Bay and major tributaries. Time restrictions probably would extend from January 1 to May 31.
Rationale	Field studies can more precisely determine flounder spawning areas. Protecting spawning areas from dredging and other disturbances will assist in ensuring the continued use of the Barnegat Bay as a spawning habitat.
Lead Responsibility	The N.J. Department of Environmental Protection and Energy (DEPE), Division of Fish, Game and Wildlife should initiate a field study and literature review to determine spawning times and locations.
Cooperating Parties	Technical assistance in this study may be required by the following parties: 1) DEPE, Land Use Regulation Element 2) N.J. Sea Grant Marine Advisory Service
Resources	Funding will be required to undertake this study. Possible sources of funding include: 1) Permit fees for coastal development 2) Annual fee for coastal development having direct impact on Bay ecology 3) Mitigation fees for violations 4) User fees a) boat operators license b) boat registration fee c) commercial harvester fee
Required Legislation	None

Action Plan #5.8	Require all fyke net licenses sold to indicate their use in Barnegat Bay
Rationale	Information gathered from license holders would be a valuable and inexpensive data set to assist the State in its efforts to monitor the vitality of the winter flounder and assess the level of fishing effort.
Lead Responsibility	The N.J. Department of Environmental Protection and Energy (DEPE), Division of Fish, Game and Wildlife should initiate the creation of a fishing survey as an attachment to a fyke net license application.
Cooperating Parties	Technical assistance may be required from the following agencies: 1) DEPE, Land Use Regulation Program 2) N.J. Sea Grant Marine Advisory Service
Resources	No significant additional monies required
Required Legislation	None

**Action Plan
#5.9**

Prohibit on-water filleting of all winter flounder.

Rationale

All winter flounder caught should be landed whole to eliminate the potential for circumventing the size limit by filleting undersized fish at sea.

**Lead
Responsibility**

The N.J. Department of Environmental Protection and Energy, Division of Fish, Game & Wildlife should initiate the revision of flounder regulations.

**Cooperating
Parties**

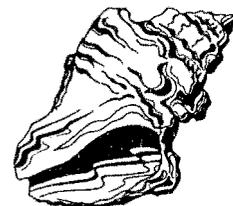
Assistance in enforcing the proposed prohibitions may include the following:
1) N.J. State Police, Bureau of Marine Law Enforcement
2) Marinas

Resources

No significant monies will be required

**Required
Legislation**

None



Objective 4	Obtain additional data relevant to the American eel fishery and amend existing regulations for better management of the resource.
Action Plan #5.10A	Conduct a survey to assess the level of fishing effort and key harvest areas for American eels in Barnegat Bay.
Action Plan #5.10B	Require all miniature fyke (eel pot) licenses sold to indicate their use in Barnegat Bay
Rationale	Information gathered from eel fishermen through a survey and the licensing process would be a valuable and inexpensive data set to assist the state in its efforts to identify eel habitats, monitor the vitality of eel and assess the level of fishing effort.
Lead Responsibility	The N.J. Department of Environmental Protection and Energy (DEPE), Division of Fish, Game and Wildlife should initiate the creation of a fishing survey as an attachment to an eel pot license application.
Cooperating Parties	Technical assistance may be required from the following agencies: 1) DEPE, Land Use Regulation Program 2) N.J. Sea Grant Marine Advisory Service
Resources	Additional funding is required to conduct a survey to assess the current status of the eel pot fishery. Possible sources of funding include: 1) Permit fees for coastal development 2) Annual fee for coastal development having direct impact on Bay ecology 3) Mitigation fees for violations 4) User fees a) boat operators license b) boat registration fee c) commercial harvester fee
Required Legislation	None

**Action Plan
#5.11A**

Better define eel potting seasons to restrict potting to when eels are actually harvested.

**Action Plan
#5.11B**

Establish a maximum number of eel pots each commercial fisherman is allowed to set in order to reduce potential user conflicts.

Rationale

These actions are proposed to prevent setting of pots before it is practical to pot eel for the sole purpose of establishing a harvesting area. Establishing a season should also reduce the problem of abandoned or lost fishing gear. After the season is closed, all pots remaining in the water will be automatically illegal and can be removed by law enforcement authorities. These proposals would also reduce conflicts between recreational fishermen, boaters and commercial fishermen.

**Lead
Responsibility**

The N.J. Department of Environmental Protection and Energy , Division of Fish, Game and Wildlife should initiate the rule and regulation revisions necessary to establish an eel potting season and maximum number of eel pots each fisherman may use.

**Cooperating
Parties**

Technical assistance may be required from the following parties:
1) DEPE, Division of Science and Research
2) N.J. Sea Grant Marine Advisory Service

Resources

No additional funding is required

**Required
Legislation**

None

Objective 5	Maintain the viability and harvest of the hard clam resource of Barnegat Bay.
Action Plan #5.12	Minimize the impact of boating related activities on hard clams and their habitat. (see also Action Plan #3.7 for details)
Rationale	Boating is an important recreational and economic resource in Barnegat Bay. However, overuse of the Bay and poorly sited facilities can have a significant adverse impact on shellfish population. Therefore, boating facilities and activities need to be carefully managed.
Lead Responsibility	<ol style="list-style-type: none"> 1) The N.J. Department of Environmental Protection and Energy (DEPE) should revise the <u>Rules on Coastal Zone Management</u>. 2) Municipalities should adopt ordinances.
Cooperating Parties	The DEPE Land Use Regulation Program needs to enforce new regulations through the permit process in consultation with the DEPE, Division of Fish, Game and Wildlife, Bureau of Shellfish and the DEPE, Science and Technical Programs, Bureau of Marine Water Classification.
Resources	None
Required Legislation	Municipalities should adopt ordinances.

Objective 6	Protect anadromous fish spawning runs within the Barnegat Bay watershed.
Action Plan #5.13	Consistently apply the regulations found in N.J.A.C. 7:7E-1.1 <u>et seq.</u> (<u>Rules on Coastal Zone Management</u>) which allow for maintenance of anadromous fish spawning runs. (see Action Plan #3.9 for details)
Rationale	Two species of herring, an anadromous fish and important forage species, are found along New Jersey's coast in marine, estuarine and lacustrine habitats. Herring are of commercial importance as a human food source, crab bait, fish meal and fish oil. They play an important role in the food web, occupying an intermediate level between zooplankton and piscivores. The <u>Rules on Coastal Zone Management</u> offer protection of these fish and should be consistently applied.
Lead Responsibility	N.J. Department of Environmental Protection and Energy (DEPE), Land Use Regulation Program to apply appropriate sections of N.J.A.C. 7:7E-1.1 <u>et seq.</u> to all appropriate development applications.
Cooperating Parties	<ol style="list-style-type: none"> 1) DEPE, Division of Fish, Game and Wildlife 2) U.S. Fish and Wildlife Service 3) U.S. Army Corp of Engineers
Resources	<p>Funding will be required to construct migration access structures. Possible sources of funding are:</p> <ol style="list-style-type: none"> 1) Permit fees for coastal development 2) Annual fee for coastal development having direct impact on Bay ecology 3) Mitigation fees for violations 4) Commercial harvester fees
Required Legislation	None

CHAPTER VI: PUBLIC ACCESS

Introduction

The Barnegat Bay waterfront with its various recreational facilities and opportunities for boating, swimming, fishing and other recreational uses is not only an important regional resource, but a statewide resource also. One of the goals of the Watershed Management Plan for Barnegat Bay is to maintain shoreline open space. This portion of the Plan attempts to strike a balance between protection of the Bay resources and accommodation of the interests of different recreational users of the Bay. This planning process has involved identifying access limitations, identifying existing and potential access opportunities and defining specific action steps to realize them.

The opportunities for access to Barnegat Bay are limited by both the extent and location of existing development and by the type of natural shoreline surrounding the Bay. The north end of Barnegat Bay (north of Route 37 to Bay Head) is densely developed, but has pockets of existing parks and access opportunities along the waterfront. Contiguous areas of tidal wetlands are located along the Metedeconk River and south into Brick and Dover Townships, thereby limiting access. In the southern end of the Barnegat Bay study region (south of Route 37 to Route 72) the upland area is less heavily developed, but expanses of tidal marsh lie between the upland edge and the open water of the Bay. The presence of environmentally sensitive wetland areas naturally limits the type and location of access sites; it is important that the possible degradation of sensitive coastal resources and potential disruption of critical wildlife habitat be considered when determining potential access locations along the Bay.

As municipalities adjacent to Barnegat Bay have become increasingly developed and user demand for recreating on the Bay has risen, opportunities to gain access to the Bay appear to be decreasing, especially as the population of the region and state grow. Both physical and visual access to the Barnegat Bay waterfront have become shrinking resources as privately owned and quasi-public land and facilities are being developed into non-water dependent uses. Opportunities for public access are further constrained by the lack of public information on locations of public access points, the limited availability of support facilities such as rest rooms, and often inadequate parking facilities at sites. In addition, crabbers and fishermen often experience access difficulties such as blocked street ends, strict parking regulations or lack of parking, all of which limit access to the waterfront.

Public recreational access to Barnegat Bay and its tributaries consists of several types, including boating access (boat ramps, marinas, car-top launches), shoreline access (docks, piers, moorings, natural shorelines), beach access (swimming), natural area access (parks, nature trails, bird observation points), scenic resources access (viewpoints, vistas) and linkage access (bicycle paths, auto tours, pedestrian trails). These access opportunities are provided through a number of means. First, Federal, State, County and local parks, wildlife management areas, beaches and boat launching sites are found throughout the Barnegat Bay shoreline, offering both direct physical access to the water and passive recreational activities adjacent to the water. Private boat launches and marinas also offer the public opportunities, at a cost, for access to the Bay. In addition, bridges and street ends adjacent to the Bay are commonly used by the public for access to the waterfront. A preliminary list (Appendix 19) of existing public access sites along the Barnegat Bay waterfront shows a variety of Federal, State, County, and local facilities in the Barnegat Bay study region: portions of the Edwin B. Forsythe National Wildlife Refuge exist at the Federal level, 8 facilities exist at the State level (including state parks, natural areas, wildlife management areas and the state marina), 6 waterfront parks exist at the County level, and approximately 37 municipal beaches, parks and boat launching sites are present. The Citizen's Public Access Subcommittee which assisted in the development of this document created a preliminary list of potential public access opportunities in the Barnegat Bay region. This list is also included in Appendix 20.

Action Agenda

This Public Access section of the Watershed Management Plan for Barnegat Bay proposes a series of public and private actions to maintain, enhance, and protect physical and visual access to the Barnegat Bay waterfront. These action plans are organized under the following objective:

- 1) Maintain, secure and improve existing and potential public access opportunities along the Barnegat Bay waterfront.

Objective 1 **Maintain, improve and secure existing and potential public access opportunities along the Barnegat Bay waterfront.**

**Action Plan
#6.1A**

Create a Coastal Access Coordination Group in the N.J. Department of Environmental Protection and Energy (DEPE) to coordinate the planning, management and development of coastal access areas and provide technical and financial assistance to local governments to improve public access opportunities.

**Action Plan
#6.1B**

Develop a Regional Public Access Plan for Barnegat Bay which provides for a network linking recreational areas adjacent to the Bay and other points of interest. Such a planning process would include:

- 1) Completing a recreation facility needs study by:
 - a) Conducting a professional survey of user demand**
 - b) Completing a comprehensive inventory of existing access facilities**
 - c) Deriving the deficits or surpluses**
 - d) Identifying the priority facility needs by type of facility and general location****
- 2) Developing a comprehensive property inventory for potential access points**
- 3) Developing environmentally sensitive site selection criteria for determining needed access sites**
- 4) Recommending design guidelines for public access facilities.**

Such a Plan should be accompanied by a Public Access Guide to Barnegat Bay as described in Action Plan #7.4.

Rationale

A Coastal Access Coordination Group would bring together the expertise of the various DEPE offices involved in public access issues. This would improve the DEPE's involvement in providing access opportunities in New Jersey's coastal zone as well as serve as a repository for information on shorefront access. Key to the State's involvement in public access are the Rules on Coastal Zone Management which serve as the basis for all State coastal permit decisions and require, where appropriate, that adequate public access to the waterfront be provided. Also, in the future, New Jersey's pass-through local coastal planning and construction grants may be reinstated to promote waterfront park and public access opportunities. Other State offices also involved in promoting public access to coastal waters include: Green Acres Program; Division of Parks and Forestry; Division of Fish, Game and Wildlife; and the Bureau of Tidelands.

A comprehensive access plan for Barnegat Bay would give the guardians of this resource - the coastal communities, County, and State - the framework for a region-wide effort to recognize, protect and improve access, and would give the public a long-range plan for developing and enjoying access opportunities. Both a comprehensive inventory of existing and potential access points and a professional user needs survey would contribute to the development of an overall regional access plan.

Lead Responsibility

- 1) The coordinated efforts of the following groups within the DEPE will be required to initiate creation of the Coordination Group:
 - a) Green Acres Program
 - b) Coastal Management Program
 - c) Division of Fish, Game and Wildlife
 - d) Division of Parks and Forestry
- 2) Ocean County Planning Board should assume the lead in preparing the Public Access Plan for Barnegat Bay

Cooperating Parties

Assistance in preparing and implementing the Plan may be required from the following agencies:

- 1) N.J. Sea Grant Advisory Service
- 2) Ocean County Parks & Recreation Department
- 3) DEPE
 - a) Coastal Management Program
 - b) Green Acres Program
 - c) Division of Parks and Forestry
 - d) Division of Fish, Game and Wildlife

Technical assistance may be required from the following agencies:

- 1) N.J. Department of Commerce, Tourism Office
- 2) N.J. Department of the Public Advocate

Resources

- 1) Coastal Management Grant funds
- 2) Green Acres funds
- 3) Non-profit Grant organizations

**Required
Legislation**

Legislation is required to create a stable source of funding and/or for new bond issues to fund the N.J. Green Acres Program. (see also Action Plan #6.5)



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**Action Plan
#6.2A**

Pursue the acquisition and funding of public access areas through a variety of techniques, such as fee simple acquisition, easements, leases and general obligation bonds, federal and state funding programs, and land trusts. Descriptions of these techniques and programs are attached in Appendix 21.

**Action Plan
#6.2B**

Plan and construct additional public shoreline access sites, such as docks, piers and ramps, along the Barnegat Bay waterfront.

Rationale

Funding sources are a critical component to accomplishing both the acquisition of new areas and the maintenance of existing facilities. Many means are available for the acquisition and funding of these public access opportunities. As discussed in Appendix 21, traditional legal and financial techniques and existing funding sources are available at the Federal and State level of governments to secure areas for recreation and open space purposes. State, County and municipal governments can pursue funding from these sources for their recreation/open space acquisition program.

A need for additional shoreline access sites in Barnegat Bay has been noted by numerous Bay users. The Ocean County Comprehensive Master Plan (1988) also recognizes the need for improved access sites to Barnegat Bay. The list of existing public access sites demonstrates that while public land, such as parks and beaches, are found along the Bay waterfront, facilities such as fishing piers and shoreline access sites are fewer in number. This shortage requires attention, as crabbing and fishing are popular activities in Barnegat Bay. Access sites should be selected based on environmental constraints, user considerations, adequate parking, and compatibility of surrounding land uses. Planning for local shoreline access sites should be coordinated at the local, regional and state level since this can be a very sensitive issue. For more information on the development, design and appropriate location criteria for siting new access sites, two documents, Waterfront Public Access: Design Guidelines and The Chesapeake Bay Area Public Access Technical Assistance Report, are available from the N.J. Department of Environmental Protection and Energy (DEPE), Office of Land and Water Planning.

Lead**Responsibility**

- 1) Ocean County Planning Board should initiate a study of suitable sites for acquisition and available funding sources.
- 2) Ocean County Parks & Recreation Department should initiate the process of identifying potential sites for public access construction projects.

Cooperating Parties

Assistance in researching and implementing this project may be required from the following entities:

- 1) Municipalities
- 2) Land trust organizations
- 3) Ocean County Parks and Recreation Department
- 4) DEPE
 - a) Green Acres Program
 - b) Fish, Game & Wildlife
 - c) Parks and Forestry
 - d) Environmental Regulation

Resources

- 1) Green Acres funds
 - 2) Coastal Management Grant funds
 - 3) Parks and Forestry funds
 - 4) Fish, Game & Wildlife funds
 - 5) municipal and county funds
- (See Appendix 21 for additional sources of potential funds related to financing recreational public access opportunities)

Required Legislation

Legislation is required to create a stable source of funding and/or for new bond issues to fund the N.J. Green Acres Program. (see also Action Plan #6.5)

**Action Plan
#6.3**

Identify and prioritize suitable, vacant waterfront lands and private facilities along the Barnegat Bay waterfront that are currently providing or have the potential to provide shoreline access, especially upland areas that are bulkheaded. Such an inventory should be produced and kept up-to-date for recreational planning and acquisition purposes.

Rationale

Vacant waterfront sites and private facilities currently used for, but not dedicated to, shoreline access may be lost by changes in land use. All levels of government should work together to secure and enhance access at these areas. Waterfront municipalities and the Ocean County Planning Board can play an important role by promoting such areas for recreation and access, by identifying them on open space/recreation master plans and by seeking Green Acres and other funding to acquire and develop such sites.

**Lead
Responsibility**

The Ocean County Planning Board should initiate the inventory of suitable access sites.

**Cooperating
Parties**

Assistance from the following agencies may be required to complete this project:

- 1) Municipalities
- 2) Ocean County Parks and Recreation Department
- 3) N.J. Department of Environmental Protection and Energy
 - a) Green Acres Program
 - b) Environmental Regulation
 - c) Division of Fish, Game and Wildlife
 - d) Division of Parks and Forestry

Resources

- 1) Green Acres funding
- 2) Coastal Zone Management Grant funds
(See Appendix 21 for additional sources of potential funds related to financing recreational public access opportunities)

**Required
Legislation**

Legislation is required to create a stable source of funding and/or for new bond issues to fund the N.J. Green Acres Program. (see also Action Plan #6.5)

**Action Plan
#6.4**

Provide appropriate shoreline fishing sites, such as fishing cat walks, at appropriate existing and new county bridge locations. For instance, the Mantoloking Bridge on County Road #528 is scheduled to be replaced under Ocean County's Transportation Improvement Program. The County should investigate maintaining and upgrading the existing bridge structure as a shoreline fishing access site.

Rationale

Coastal bridges are a common area for recreational fishermen and crabbers. Some bridge crossing areas in Barnegat Bay have the potential to serve as official shoreline fishing access sites, such as through the use of cat walks. This is especially relevant for bridges being reconstructed or replaced. By providing suitable and safe sites on bridges for anglers and crabbers, greater public access opportunities are provided in terms of shoreline fishing access. Design and implementation of public access along bridge locations has been done at Longport-Somers Point Bridge in Atlantic County and Corson's Inlet Bridge in Cape May County.

**Lead
Responsibility**

The Ocean County Planning Board should investigate potential public fishing sites.

**Cooperating
Parties**

Technical assistance may be required from the following agencies:

- 1) Ocean County Engineering Department
- 2) N.J. Department of Transportation
- 3) N.J. Department of Environmental Protection and Energy,
 - a) Environmental Regulation
 - b) Division of Fish Game and Wildlife

Resources

- 1) N.J. Department of Transportation to fund bridge upgrading
- 2) Federal Department of Transportation to fund bridge upgrading
- 3) Federal Sport Fish Restoration Account of the Wallop-Breaux Trust Fund to provide public access improvements

(See Appendix 21 for additional sources of potential funds related to financing recreational public access opportunities).

Required
Legislation

None



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**Action Plan
#6.5**

Enact legislation to establish stable sources of funding to local, County and State agencies for public open space acquisition, facility development, and the operation and maintenance of recreational facilities.

Rationale

Public waterfront access facilities are acquired, developed, operated and maintained by local, County and State agencies, often through limited funds and user fees. Adequate funds for acquisition, development, and operation and maintenance of access facilities is a problem at all levels of government, as existing recreation financial resources are being stretched. This lack of funding has resulted in the continual deterioration of existing facilities. Money needs to be made available to provide for ongoing acquisition, development and maintenance of these areas. The enactment of legislation for a permanent source of funds for acquisition, development, and operation and maintenance needs is critical.

**Lead
Responsibility**

N.J. State Legislature should create a dedicated, stable funding source for public open space acquisition.

**Cooperating
Parties**

Technical assistance may be required from the N.J. Department of Environmental Protection and Energy (DEPE):

- 1) Natural and Historic Resources Group
- 2) Legislative Affairs

Resources

None

**Required
Legislation**

Legislative initiative is needed to establish stable sources of funding for outdoor recreation operation and maintenance needs. Examples of New Jersey legislative bills relating to stable sources of funding for open space are available from the DEPE, Office of Land and Water Planning.

**Action Plan
#6.6**

Amend the environmental, open space and recreation planning components of the N.J. Municipal Land Use Law (N.J.S.A. 40:55D-1 et seq.) to enable municipalities to require mandatory public dedication of recreation/open space adjacent to tidally flowed waters as part of the conditions of approval for residential subdivisions.

Rationale

Municipal power to plan and zone is articulated in the Municipal Land Use Law (MLUL), though it does not include the power to require mandatory public dedication of recreation/open space adjacent to tidally flowed waters. By amending the MLUL, municipalities would be better equipped to promote the tidal waterfront access opportunities which are already entrusted to the public through New Jersey's Public Trust Doctrine. The Coastal Management Program policy on public access (see N.J.A.C. 7:7E-1.1 et seq.) can be used as technical guidance to municipalities. The policy requires that: "Coastal development adjacent to all coastal waters, including both natural and developed waterfront areas, shall provide permanent perpendicular and linear access to the waterfront to the maximum extent practicable, including both visual and physical access. Development that limits public access and the diversity of the waterfront experience is discouraged." This policy sets forth the guidelines for the appropriate public access design and use for an area.

**Lead
Responsibility**

The N.J. State Legislature, which has exclusive authority to amend the Municipal Land Use Law

**Cooperating
Parties**

Technical assistance may be required from the following agencies:
1) N.J. Department of Environmental Protection and Energy,
Environmental Regulation
2) N.J. Office of State Planning
3) Ocean County Planning Board

Resources

No significant monies required

**Required
Legislation**

Amendment to the New Jersey Municipal Land Use Law

**Action Plan
#6.7**

Plan and zone, as part of the municipal master planning process, waterfront land for uses which would both encourage and not preclude public access, such as open space, conservation and marine-related uses. (see also Action Plan #2.26)

Rationale

The N.J. Municipal Land Use Law (N.J.S.A. 40:55D-1 et seq.) gives municipalities the authority to include open-space and recreation elements. Such elements in a plan will give a municipality a goal for open space and recreation land acquisition.

**Lead
Responsibility**

Municipal planning boards should include public open space planning as part of their regular municipal master plan revision process.

**Cooperating
Parties**

Technical assistance may be required from the following agencies:

- 1) N.J. Department of Environmental Protection and Energy,
 - a) Environmental Regulation
 - b) Office of Environmental Services
- 2) N.J. Office of State Planning
- 3) Ocean County Planning Board

Resources

No significant monies required

**Required
Legislation**

None

**Action Plan
#6.8**

Prioritize public funds for dredging and shore protection to those areas that provide a public benefit, such as areas that provide public access opportunities.

Rationale

Careful prioritization of public dredging and shore protection funds can encourage public access opportunities on the Bay waterfront. For example, if public monies used for the dredging of lagoons and water areas are used first in those areas that provide public boating access opportunities, this benefits the public overall, as well as specific private users of lagoon waterways.

**Lead
Responsibility**

The prioritization of potential public access sites and funding sources should be initiated by the following agencies:

- 1) N.J. Department of Environmental Protection and Energy, (DEPE)
 - a) Environmental Regulation
 - b) Natural & Historic Resources

**Cooperating
Parties**

DEPE, Green Acres Program

Resources

State funds for dredging and shore protection

**Required
Legislation**

None

**Action Plan
#6.9**

Investigate and decide whether or not a fee based on fair market value should be charged to local governments leasing riparian lands solely used for park and recreational purposes.

Rationale

The N.J. Tidelands Resource Council charges fees for leases which allow people to use land which is currently or was formerly flowed by the tide. Under Attorney General F.O. 1978, No. 8, the State decided that adequate consideration in the amount of fair market value of the tidally flowed land conveyed to municipalities and counties for the exclusive use of park and recreational purposes was appropriate. As a consequence, municipalities often have to pay the State this fee before local waterfront public access can be provided. This financial requirement can make the development of waterfront public access cost prohibitive unless relatively high user fees are then charged to compensate for the cost of the tidelands conveyance. Therefore, charging municipalities for leases to provide public access which will not have associated user fees may be seen as being contrary to the Public Trust Doctrine (under which the Tidelands Resource Council functions), the purpose of which is to promote ready public access to the waterfront and water areas. Hence, it may be more appropriate to charge municipalities a nominal fee, at maximum, if they propose to provide waterfront public access with no associated user fees.

**Lead
Responsibility**

The following agencies should coordinate in this decision making process and request a new Attorney General opinion to reverse Attorney General F.O.1978, No.8:

- 1) N.J. Department of Environment Protection and Energy
 - a) N.J. Tidelands Resource Council
 - b) Office of Tidelands
 - c) Green Acres Program

**Cooperating
Parties**

Technical assistance may be required from the following parties:

- 1) Ocean County Board of Chosen Freeholders
- 2) Ocean County municipalities
- 3) Department of Law and Public Safety, Office of the Attorney General

Resources

Tidelands conveyances or Use Agreements

Required
Legislation

None



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CHAPTER VII: PUBLIC PARTICIPATION AND EDUCATION

Introduction

The future health and welfare of the Barnegat Bay watershed is in the hands of all the residents of and visitors to the area. This is especially true with regard to the implementation of this plan. No one body has the authority to make the action plans in this document come to fruition; it is only through a united effort on the part of all affected parties that this management plan can work.

Citizen participation will be important in terms of individual behavior modification, education of each other, collection of data and influencing governmental bodies to facilitate the implementation of appropriate action plans. Therefore, the general public must be continually made aware of their connection to the Bay. In the Watershed Management (Chapter II) section of this plan, it was recommended that a citizens Watershed Association be formed. This Barnegat Bay Watershed Association will be key to carrying out the recommendations of the Public Participation and Education chapter. Programs to educate and inform citizens about the importance of the Bay as an economic, recreational and natural resource need to be implemented with the assistance of this group. It should also be noted that many efforts are community based, do not require State involvement and can be financed through grant programs or in-kind donations by businesses and community organizations.

Action Agenda

The overall objective of these recommendations is as follows:

- 1) Encourage the implementation of the management plan and support environmental education that promotes and encourages an environmental ethic in the citizens of the Barnegat Bay Watershed by demonstrating their connection to, and impact on the health and welfare of the region.

Objective 1 Encourage the implementation of the management plan and support environmental education that promotes and encourages an environmental ethic in the citizens of the Barnegat Bay Watershed by demonstrating their connection to, and impact on the health and welfare of the region.

Action Plan #7.1 Once established, a Barnegat Bay Watershed Association and the affiliated Barnegat Bay Keeper Program should conduct educational programs. (see also Action Plan #2.6)

Rationale Watershed associations are composed of citizens who are intimately familiar with local issues and resources and who, therefore, are best suited to coordinate with other groups and provide a well directed educational program. An integral part of this program is the education of agencies, businesses and the general public about how to prevent pollution. This role would naturally fall to the entity responsible for tracking pollution in the Bay - the Barnegat Bay Keeper.

Lead Responsibility 1) Members of the Barnegat Bay Watershed Association
2) The Barnegat Bay Keeper

Cooperating Parties

- 1) New Jersey Department of Environmental Protection and Energy (DEPE)
- 2) Association of New Jersey Environmental Commissions
- 3) Ocean County Soil Conservation District
- 4) Schools
 - a) Teachers
 - b) Student Groups
 - c) Parent/Teacher Associations
- 5) Environmental organizations
- 6) Ocean County government
- 7) Municipal governments
- 8) N.J. Sea Grant (Barnegat Bay Watch Monitoring Program)
- 9) Alliance for New Jersey Environmental Education
- 10) Scouting organizations
- 11) Civic groups

Resources

- 1) Private foundation support
- 2) DEPE, Office of Environmental Services Matching Grant Program
- 3) Membership fees and donations

**Required
Legislation**

- 4) Corporate contributions
- 5) N.J. Department of Education

None



**Action Plan
#7.2**

Develop a media campaign with local newspapers, radio stations, cable and television stations to publicize the plan and encourage behavior which is sensitive to the natural environment. This effort should be initiated by student groups.

Rationale

This project will give student groups the opportunity to practice their skills with audio visual equipment in a real situation that could have an important impact on how the Bay is perceived by the general public.

**Lead
Responsibility**

- 1) Barnegat Bay Watershed Association, if existent, or
- 2) Environmental Education Network
- 3) Ocean County Environmental Agency

**Cooperating
Parties**

- 1) Association of New Jersey Environmental Commissions
- 2) Alliance for New Jersey Environmental Education
- 3) Ocean County Soil Conservation District
- 4) Local environmental groups
- 5) Local high school and college clubs that are members of the Youth Environmental Society
- 6) Local N.J. Water Watch groups

Resources

Use a local high school or county college audio visual class to donate time as a class or club project to create the Public Service Announcements.

**Required
Legislation**

None

**Action Plan
#7.3A**

Offer an annual Barnegat Bay Education Week that highlights the unique features of the Bay including its multi-use nature, the importance of conservation and proper land and water management, and ways to make lifestyle changes that promote behavior which minimizes negative impacts on the natural environment.

**Action Plan
#7.3B**

Include a Barnegat Bay Festival as a portion of Barnegat Bay Education Week. This festival should integrate fun, educational opportunities and provide a day when all citizens have an opportunity to focus on the unique features of the Bay ecosystem and learn more about individual behavior modifications they can make to improve the quality of the environment in the watershed. The festival should also include presentation of awards to people for activities involving implementation of A Watershed Management Plan for Barnegat Bay. The festival should be planned so that it does not contribute to traffic, litter and other pollution problems. The Ocean County Environmental Conference could serve as a model.

**Action Plan
#7.3C**

Use the first Barnegat Bay Education Week to kick-off a nonpoint source pollution prevention project which includes a storm drain painting project similar to the Crab Connection (sponsored by Clean Ocean Action and Alliance for a Living Ocean). This project would include the painting of stencils of Bay wildlife and a slogan on storm drains so that people become aware that the drains empty into the Bay and contribute to non-point source pollution.

**Action Plan
#7.3D**

Develop a Barnegat Bay Environmental Education Display Booth to carry the theme of Barnegat Bay Education Week to related festivals throughout the year.

Rationale

An education week on the importance of behavior and activities which are sensitive to the natural environment would point out to citizens on an individual and personal level how they are linked to the pollution problems of the Bay, and the way they can make simple changes or adjustments to their activities to improve the health and welfare of the Bay. The week would thus foster a personal connection and sense of responsibility to the Bay. This week could be the culmination of a year-long education campaign through the media, local schools, businesses and local parks and coincide with the annual Ocean County Environmental Conference or Earth Day.

A Barnegat Bay Festival would serve as an annual reminder and forum to educate citizens in the watershed about the unique ecology of the Bay. The education component could demonstrate a person's connection to the Bay, and how individual activities affect the health of the Bay and ultimately its value as a recreational and economic resource. The festival should be designed to attract and reach out to all sectors of society. The day would be the focus of the Environmental Education Week, while emphasizing how to enjoy the Bay in an environmentally sensitive manner.

The stencil contest would spark an interest in nonpoint source pollution and create an understanding of the connections between people and pollution. Once the stencils are in place it would be a constant reminder of the connection between land and water pollution. The development of a traveling booth would also serve as a continual educational device.

Lead Responsibility

- 1) Environmental Education Network and Ocean County Soil Conservation District to organize Barnegat Bay Education Week
- 2) Ocean County Chamber of Commerce to sponsor the Barnegat Bay Festival
- 3) To lead the stenciling project:
 - a) Local governments
 - b) Non-profit environmental organizations
- 4) To present awards for implementation of the Plan:
 - a) Barnegat Bay Watershed Association, or
 - b) Ocean County Environmental Agency

Cooperating Parties

- 1) Association of New Jersey Environmental Commissions
- 2) Alliance for New Jersey Environmental Education
- 3) Local environmental and recreational groups
- 4) Local interpretive centers such as Cattus Island and Wells Mills County Parks
- 5) Scouting and educational organizations

Resources

- 1) Donations
- 2) Exhibitor fees
- 3) Entrance fees
- 4) A contest with a small entrance fee could be offered to develop a stencil. Half of the entrance fee could be used to fund stencil painting along storm drains, the other half could be presented to the person with the winning entry.

Required Legislation

None



**Action Plan
#7.4A**

Develop and publish a comprehensive Public Access Information Guide to existing public access areas surrounding Barnegat Bay. The Guide should include location information on access sites, facility descriptions, public transportation, natural resource information, and education and conservation-oriented information. A sign program should accompany a Guide Plan with public access signs or logos locating access points. (see also Action Plans #3.3 and #6.1)

**Action Plan
#7.4B**

Develop Bay Watch Signs similar to neighborhood watch signs to remind people that they are in the Barnegat Bay watershed and should be aware of potential sources of pollution.

Rationale

Publicity and education are important components of the enhancement of public access opportunities and the care of natural resources. The Guide and the sign program can provide information on public access sites, facilities, fees and public transportation, and encourage stewardship of these resources. Residents of and visitors to the watershed will be educated on environmental resources of the Bay, the potential adverse effects of their activities and actions they can take to minimize the potential negative effects. The development of a Public Access Information Guide should include input from every level of government, private organizations and citizens.

**Lead
Responsibility**

Assembling and publishing the information guide and development of sign program should be initiated by the following agencies:

- 1) Ocean County Parks and Recreation Department
- 2) Ocean County Tourism Advisory Council, Economic and Industrial Development Department
- 3) Ocean County Environmental Agency

**Cooperating
Parties**

Technical assistance in this project may be required from the following agencies:

- 1) N.J. Department of Transportation (DOT)
- 2) N.J. Department of Commerce, Tourism Office
- 3) Department of Environmental Protection and Energy, Green Acres
- 4) Local public works departments
- 5) Ocean County Parks and Recreation Department

- 6) Ocean County Engineer - Sign Shop
- 7) N.J. Sea Grant Marine Advisory Service

Resources

- 1) Coastal Management Grant funds
- 2) DOT funds
- 3) N.J. Tourism funds
- 4) Ocean County Tourism funds
- 5) Green Acres Grants
- 6) Private foundation funds

**Required
Legislation**

Possible local ordinances to put up signs

**Action Plan
#7.5**

Encourage local grocery stores to print Barnegat Bay specific messages on their shopping bags.

Rationale

A message on shopping bags about the Barnegat Bay Festival and Education Week would help advertise the events. In addition, generic messages about the importance of recycling and pollution prevention within the watershed could also be printed to help educate the public.

**Lead
Responsibility**

- 1) Environmental Education Network
- 2) Ocean County Environmental Agency
- 3) Ocean County Soil Conservation District

**Cooperating
Parties**

Grocery store chains

Resources

Funds will be necessary for printing the grocery bags

**Required
Legislation**

None

**Action Plan
#7.6**

Conduct information sessions that encourage the correct disposal of waste water at pump-out stations. Publicize the existence and locations of such stations by handing out the N.J. Department of Environmental Protection and Energy (DEPE) pamphlets at boater registration.

Rationale

Information sessions will help educate user groups and individuals, so that they realize they have a critical role to play in the prevention of pollution to the Bay and should dispose of boat wastewater in an environmentally responsible and appropriate manner at pump out stations. Also, distribution of pump-out station information at boater registration time will reach a large audience and hopefully increase compliance with disposal regulations. Pamphlets should also be distributed at marinas, at boat dealers and stores where boating equipments is sold.

**Lead
Responsibility**

- 1) Barnegat Bay Watershed Association, if existent
- 2) Local marinas
- 3) DEPE
- 4) Rutgers Cooperative Extension of Ocean County

**Cooperating
Parties**

- 1) Association of New Jersey Environmental Commissions
- 2) Local environmental groups
- 3) N.J. Sea Grant Marine Advisory Service

Resources

- 1) Radio broadcasts
- 2) Community access cable-television broadcasts
- 3) Newspaper publicity
- 4) Up-front donations
- 5) Registration fees
- 6) DEPE, Office of Environmental Services Matching Grant Program

**Required
Legislation**

None

**Action Plan
#7.7**

Adapt existing ocean and water resources curricula from the N.J. Department of Environmental Protection and Energy (DEPE) and other organizations to include a Barnegat Bay focus. Make this curricula available to local educators through schools, the Learning Link network, visitor centers and interpretative centers. (see also Action Plan #3.3)

Rationale

Education is the key ingredient to affecting social change. Educating school age children about the Bay could influence the development of positive environmental behavior and habits. Such behavior changes in their children may influence changes in parents' attitudes toward the Bay, thus fostering an environmental ethic in the citizens of the watershed.

**Lead
Responsibility**

- 1) Environmental and educational organizations
- 2) Ocean County Department of Constituent Services, Tourism
Advisory Council
- 3) Ocean County Parks and Recreation Department
- 4) Ocean County Soil Conservation District

**Cooperating
Parties**

- 1) Scout organizations
- 2) Ocean County school system
- 3) Ocean County libraries
- 4) DEPE
- 5) N.J. Sea Grant Program
- 6) N.J. Marine Sciences Consortium

Resources

Grants from private foundations to develop curricula

**Required
Legislation**

None

**Action Plan
#7.8A**

Encourage local planning board officials to be certified and maintain a requisite number of continuing education credits per year over the course of their term. Basic courses could include a review of the jurisdiction and development review processes of all levels of government. Possible advanced topics are: stormwater runoff, tree protection ordinances, conservation zones, etc.

**Action Plan
#7.8B**

Establish an annual local conference for planning board and board of adjustment members to explain development review processes at all levels of government.

Rational

Continued training of planning board and board of adjustment officials will enable them to remain apprised of the most recent environmental and land use planning information as it relates to their responsibilities. A comprehensive review of the development review procedures will also expedite the decision-making process.

**Lead
Responsibility**

- 1) New Jersey Federation of Planning Officials to organize a training course
- 2) To organize a conference:
 - a) New Jersey Department of Environmental Protection and Energy (DEPE)
 - b) Association of New Jersey Environmental Commissions
 - c) New Jersey County Planners Association

**Cooperating
Parties**

- 1) Municipal planning boards and boards of adjustment
- 2) Environmental commissions
- 3) Rutgers University Office of Continuing Education
- 4) DEPE
- 5) Ocean County Soil Conservation District
- 6) N.J. Pinelands Commission
- 7) Ocean County Planning Board
- 8) Ocean County College

Resources

- 1) N.J. Department of Community Affairs should provide funding for this program
- 2) Private foundation funds

**Required
Legislation**

None



**Action Plan
#7.9**

Include Barnegat Bay education materials in the lifeguard training program and Coast Guard Safe Boating Course.

Rationale

Lifeguards are frequently the first person on the scene when garbage has been washed up on the beach, a pollution problem has been discovered or questions are asked about water quality and safety for recreational use. They should be equipped with accurate information and, therefore, provide a link between the N.J. Department of Environmental Protection and Energy (DEPE) and citizens about potential problems. In the training program that lifeguards receive, a segment should be added about water quality and reporting pollution, so they will be better informed to answer citizens' questions and know when to report a potential problem.

Information specific to Barnegat Bay is also important for boaters so that they better understand their potential impact on the Bay and will be better equipped to report pollution problems they observe.

**Lead
Responsibility**

- 1) Lifeguard associations
- 2) U.S. Coast Guard

**Cooperating
Parties**

DEPE

Resources

Materials prepared by the DEPE

**Required
Legislation**

None

**Action Plan
#7.10**

Publish educational materials including a map depicting near-shore critical habitats and restricted areas, and disseminate that information to the boating public. All restricted areas should be identified and posted.

This brochure should also identify submerged aquatic vegetation (SAV) habitats and existing channels, and contain information concerning the importance of SAV to the Bay ecology and potential damage caused by prop scar. The brochure should include an advisory for boaters and users of personal watercraft to avoid these areas and for boaters to use existing navigation channels where possible. (see also Action Plan #5.4)

Rationale

Near-shore critical habitats include endangered and threatened species habitats, colonial water bird nesting sites (such as herons, egrets, ibis, terns, and skimmers), and migratory waterfowl stopover sites. Many of these species are not tolerant of human contact. Therefore, human disturbances can render habitat unsuitable for these important species, further threatening their survival in New Jersey.

The operation of power vessels across shallow beds can physically damage submerged vegetation and result in chronic minor disturbances such as prop scars. While singular scars from crossings are probably quickly repaired by rhizomes and new shoots, the cumulative effect of many crossings could be destructive to the bed.

**Lead
Responsibility**

- 1) N.J. Department of Environmental Protection and Energy (DEPE), Office of Land and Water Planning to publish educational materials
- 2) Barnegat Bay Watershed Association, if existent

**Cooperating
Parties**

- 1) DEPE, Divisions of Parks and Forestry and Fish, Game and Wildlife to identify and post restricted areas as necessary
- 2) Private land owners to post restricted areas, or for permission to post, where critical habitats are in private ownership
- 3) DEPE, Office of Communications
- 4) Area Realtors and water vehicle rental agencies to distribute materials to watershed visitors

Resources

Money is needed to publish the brochure once it is developed. Money for this brochure may possibly be available from the DEPE's Federal coastal zone management grant or N.J. Sea Grant.

**Required
Legislation**

None

**Action Plan
#7.11**

Improve the public awareness of existing vessel speed and operation regulations to provide clearer direction to watercraft operators. This information should be included in a brochure identifying congested areas and speed advisories. (See also Action Plan #4.5)

Rationale

The numbers of motorized watercraft operating on Barnegat Bay are creating nearly continuous traffic in small channels adjacent to residential areas during peak use hours. This continual traffic is injurious to docked vessels and protected shorelines when "no wake" zones are ignored, and it is intrusive on the homeowners if muffling devices have been altered or are not maintained. The existing navigation regulations address these issues (N.J.A.C. 7:6-1.1 et seq.). Amendments to those regulations at N.J.A.C. 7:6-1.31 became effective April 15, 1991 requiring power vessels to slow to minimum headway when passing within 200 feet of a developed waterfront.

New noise standards were also adopted at N.J.A.C. 7:6-6.3 which permit a "standing" test rather than a "pass-by" test to be administered. This will make enforcement of the noise standard easier. Increased awareness by the boating public and strict enforcement of these regulations will address many of these conflicts.

**Lead
Responsibility**

N.J. Department of Environmental Protection and Energy (DEPE), Office of Land and Water Planning to design brochure

**Cooperating
Parties**

- 1) To assist in brochure development:
 - a) N.J. State Police, Bureau of Marine Law Enforcement
 - b) N.J. Boat Regulation Commission
- 2) To distribute brochure:
 - a) N.J. Division of Motor Vehicles
 - b) U.S. Coast Guard Auxiliary
 - c) Marinas

Resources

Funding is needed to publish a brochure. Ideally, funding would originate from the Department of Law and Public Safety, but may come from the DEPE or the N.J. Sea Grant Program.

**Required
Legislation**

None

**Action Plan
#7.12**

Provide Teacher Training Workshops on environmental education, with an emphasis on the ecology and environment of Barnegat Bay. Workshops will provide teachers with a basis on which to introduce Barnegat Bay-oriented environmental education in their lesson plans. This program could be facilitated by the creation of environmental education commissions similar to Brick Township's in each municipality.

Rationale

One of the most important aspects of introducing environmental education curricula into the classroom is to provide teachers with the tools necessary to integrate environmental concepts at the appropriate time and location in a school calendar. Teacher Training Workshops and an environmental education commission would provide teachers with the tools and the support to develop curricula that would respond to teacher and student needs.

**Lead
Responsibility**

1) Ocean County Soil Conservation District

**Cooperating
Parties**

- 1) Brick Township Environmental Education Commission
- 2) Youth Environmental Society through their Earth Care Seminars
- 3) Catus Island County Park and Interpretive Center
- 4) Ocean County College
- 5) N.J. Department of Environmental Protection and Energy (DEPE)
- 6) N.J. Marine Sciences Consortium
- 7) Ocean County Environmental Agency

Resources

- 1) Workshops could be self-supporting through tuition charges
- 2) DEPE, Office of Environmental Services Grants

**Required
Legislation**

None

**Action Plan
#7.13**

Develop a speakers bureau of local environmental experts who can speak to professional organizations, business organizations, clubs, religious groups, senior citizen organizations, etc. about environmental concerns in the Barnegat Bay watershed.

Rationale

A speakers bureau would provide an opportunity to meet with citizens who may not be well informed about the environmental problems and pressures facing the Barnegat Bay watershed. This would be an ongoing mechanism to discuss, inform and educate citizens to the value and importance of the watershed.

**Lead
Responsibility**

- 1) Barnegat Bay Watershed Association, if existent, or
- 2) Ocean County Environmental Agency

**Cooperating
Parties**

- 1) Catus Island County Park and Interpretive Center
- 2) Environmental Education Network
- 3) Association of New Jersey Environmental Commissions
- 4) Ocean County College
- 5) Ocean County Soil Conservation District

Resources

None

**Required
Legislation**

None

CHAPTER VIII: RESEARCH AND MONITORING

Introduction

The Barnegat Bay watershed probably changed very gradually during the 250 years following the first colonial settlements. Since 1950, Ocean County has experienced unprecedented population growth, increasing 665% between 1950 and 1990. Intensive development, insensitive land-use patterns and increased boating have overwhelmed the natural systems of the Bay and its watershed:

During the tremendous growth of the past decades, we have closely monitored development activities. Municipalities approve and monitor development proposals, building uses and types, housing demands and the traffic patterns generated by all this development. However, no one has comprehensively monitored the changes and health of the natural environment of the Bay and watershed.

Increased development and human activity certainly have had an impact. Forests have been depleted and wetlands have been filled. Increased levels of sediments and contaminants have been introduced into the Bay. Shellfish beds have been closed due to contamination, fishing harvests have declined and underwater vegetation has been damaged. In the past, environmental preservation efforts were designed to address specific development proposals or pollution threats. Today, we must begin to consider the health of the entire Bay system, rather than respond to a specific symptom of poor health.

We know that the landscape altered by development changes dramatically how water flows from uplands to the Bay and what that water carries with it to the Bay. But what we do not understand so thoroughly is how increased sediments, septic leachate and other pollutants affect the Bay's finfish and bottom-dwelling creatures. Naturally variable systems like the Bay and its watershed do not decline in neat or predictable increments. Therefore, we need to monitor the Bay's health constantly over time to know whether it is healthy or deteriorating and whether nature or man is responsible for the change.

Some components of the watershed are readily observable and will be easy to monitor. Land monitoring should track trends in the watershed and include forest health, wetland patterns and conditions, sensitive sites and species habitats. Other areas are not easily observable and will be more difficult to monitor. For instance, the Bay bottom is not readily visible, so shellfish and finfish will be difficult to study. Changes in water quality will only be apparent after continuous testing. As well as directly monitoring elements of the Bay, we should also monitor indicators of its health, such as birds.

Research into the biological and physical factors that 'drive' the Bay is essential to a monitoring program. Research and monitoring proceed along different timetables, and have different aims, but work together so that each is refined and improved by the other. As the monitoring program tracks changes in the Bay's condition over time, research will help to identify causes of the problems that affect the Bay, and will contribute to solutions including better ways to do monitoring.

Funding for research and monitoring is vulnerable to elimination during economic recessions and budget crises. But Barnegat Bay is an important component of the tourist economy of New Jersey, especially that of Ocean County. This research and monitoring component of the Watershed Management Plan for Barnegat Bay is a positive step toward preventing further damage and improving this valuable asset. Research and monitoring give legislators and citizens the necessary information to adjust regulations and personal behavior to preserve and enhance the Bay.

Action Agenda

The action steps outlined in this chapter are divided into monitoring needs and research needs and are listed under one of the following two objectives. Expanded definition of these objectives is contained in Table 7. Action Plan #8.1 concerns a comprehensive Barnegat Bay Ambient Monitoring Program which was developed by the Research and Monitoring Subcommittee, with input from the Citizens Advisory Committee, and is described more fully in Appendix 22. Action Plans #8.2, #8.3 and #8.4, which also fall under the monitoring objective, address specific concerns.

- 1) To establish an integrated program of data collection, analysis, synthesis, and interpretation that will enhance baseline information; characterize spatial and temporal trends of conditions in the Bay and of human and other factors that affect those conditions; and monitor the effectiveness of the management plan and assure that refinements are made as appropriate.
- 2) To establish and maintain a system of priorities, funding and dissemination of research that adds to our knowledge of the human, physical and biological systems of the Barnegat Bay watershed; identifies causes and solutions of pollution problems and impaired uses; and assists decision-making activities of regulatory and management agencies while stimulating creativity and excellence in research.

Objective 1

To establish an integrated program of data collection, analysis, synthesis, and interpretation that will enhance baseline information; characterize spatial and temporal trends of conditions in the Bay and of human and other factors that affect those conditions; and monitor the effectiveness of the management plan and assure that refinements are made as appropriate.

**Action Plan
#8.1**

Create a Barnegat Bay Ambient Monitoring Program that will collect and analyze samples and carry out surveys to determine the quality of the water, sediments, biological populations, and habitats of the Barnegat Bay drainage basin, using protocols, quality assurance checks, data storage and reporting procedures. Provide a permanent technical staff responsible for coordinating the components of the program, analyzing and interpreting data, and preparing annual reports. (see Appendix 22)

Support the citizens' monitoring program which is collecting data which will supplement the Barnegat Bay Ambient Monitoring Plan and act as an educational and public involvement tool. Citizen monitors have been asked to carry out portions of the Barnegat Bay Ambient Monitoring Program tasks deemed to be appropriate by the coordinating body and implementing agencies. The monitoring program staff shall provide technical support for citizens' monitoring projects. Data collected under the citizens' monitoring program will be subject to the same (or similar) protocols and quality assurance checks as all other portions of the Barnegat Bay Ambient Monitoring Program.

Rationale

A comprehensive program for monitoring the human, physical, and biotic factors that determine and reflect conditions in the Bay is an essential tool for evaluating the effectiveness of the management plan and its component action plans. It will also contribute to knowledge about natural variations in the Bay, and support refinements to the management plan over time. Table 7 shows how monitoring of specific parameters, as described in Appendix 22, will meet the overall aims of the monitoring program.

**Lead
Responsibility**

The Barnegat Bay Research & Monitoring Subcommittee (both the N.J. Department of Environmental Protection and Energy (DEPE) and Citizens groups) should form the basis of a permanent oversight committee, comprised of representatives of DEPE, other agencies, citizens, researchers, regulators and managers from all levels of government.

The Citizens Monitoring Program should continue to be coordinated and conducted by the N.J. Sea Grant Program

**Cooperating
Parties**

- 1) Academic institutions
- 2) State and Federal agencies
- 3) The business community
- 4) The agricultural community
- 5) Environmental groups
- 6) Private research organizations.

Resources

- 1) Existing programs need to place a high priority on research and monitoring activities in Barnegat Bay, including greater allocation of program funds for this purpose.
- 2) A considerable amount of new funding is required to carry out the comprehensive monitoring program described in the plan. A major commitment of funds by the DEPE and/or legislature is required.

**Required
Legislation**

New legislation should be introduced to further the mandate of the original Act to protect the environment of Barnegat Bay. The new legislation should provide funding for monitoring the response of the Bay environment to the various action plans implemented.

**Action Plan
#8.2**

Create an independent staff to coordinate the many components of the research and monitoring plan, analyzing and interpreting results and preparing annual reports for the Barnegat Bay Watershed Association and the public.

Rationale

The successful implementation of a Bay management plan will require personnel to coordinate activities, analyze and interpret data. A small staff will be required to undertake these activities and should be assigned these tasks without conflict or interference from other project assignments

**Lead
Responsibility**

N.J. Department of Environmental Protection and Energy,
Division of Science and Research

**Cooperating
Parties**

N.J. Marine Sciences Consortium

Resources

Funding will be required to staff a research and monitoring program.

**Required
Legislation**

None

Objectives - Monitoring Plan
(see Table 7)

1. Understand natural oceanographic events and processes that may influence biota, water quality and beneficial uses.
2. Determine trends and natural variability in abundance of biota, especially important resource species.
3. Determine trends in factors that may affect human health.
4. Determine trends in inputs and concentrations of anthropogenic pollutants and trends in other human activities that may affect conditions in the Bay.
5. Determine temporal and spatial trends of receiving system properties.
6. Determine the effects of changes in regulatory and management decisions and practices.
7. Determine trends in the aesthetic appearance of the Bay.
8. Provide an early warning of detrimental or unwanted changes in the Bay and its natural communities.

Table 7
Monitoring Parameters and Objectives

Monitoring Parameters	Monitoring Objectives							
	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8
1) Temperature, salinity & dissolved oxygen					X			
2) Nutrients	X			X	X	X		
3) Turbidity	X					X	X	
4) Pathogen indicators in water and shellfish		X		X	X	X		
5) Phytoplankton abundance and composition & chlorophyll <u>a</u> concentrations		X			X			X
6) Macrophyte abundance		X						X
7) Shellfish & finfish abundance		X				X		
8) Benthic community structure		X			X			X
9) Toxic contaminants in aquatic biota and sediments			X	X				
10) Histopathological abnormalities								X
11) Bird abundance & reproductive success		X						X
12) Toxic contaminants in birds				X		X		X
13) Floatables						X	X	
14) Shoreline habitat and sensitive areas					X	X		
15) River discharges and quality	X			X		X		
16) Groundwater discharge and quality	X			X				
17) Fishing efforts and landings		X		X		X		
18) Dredging (area & volume)				X				
19) Boating use				X		X		X
20) Atmospheric and other pollutant inputs				X		X		X
21) Climate & weather data	X							
22) Regulatory & management measures						X		
23) Socioeconomic conditions				X		X		
24) Rare plant & animal populations		X			X	X		X

**Action Plan
#8.3**

Monitor for nonpoint delivery reduction, such as best management practices, detention basins and infiltration basins, to measure the effectiveness of such facilities in reducing pollutant levels entering Barnegat Bay. Often, planners and engineers rely on these facilities to capture and remove pollutants just prior to delivery into a receiving water. Therefore, monitoring of their performance is warranted.

Rationale

The effectiveness of basins, trenches and other stormwater facilities for pollutant removal can be reduced by poor maintenance and construction. Data are sparse for the removal of certain pollutants such as oil and nutrients. Also, the effect of unique coastal conditions, such as high sedimentation, high water table and tidal influence, has not been determined on best management practice performance.

**Lead
Responsibility**

N.J. Department of Environmental Protection and Energy

**Cooperating
Parties**

- 1) Ocean County Soil Conservation District
- 2) Ocean County Health Department
- 3) Municipal health departments

Resources

Funding is required. Possible federal funding through the Nonpoint Source Pollution (Section 319) or Stormwater Permitting (Section 402p) sections of the Federal Clean Water Act

**Required
Legislation**

None

**Action Plan
#8.4**

Monitor the condition of navigation in the Bay to identify hazards to navigation from vessel operation or special uses.

Rationale

Monitoring of navigational hazards is not currently performed in the Bay. This should be undertaken to protect public safety.

**Lead
Responsibility**

- 1) N.J. State Police, Bureau of Marine Law Enforcement
- 2) N.J. Boat Regulation Commission

**Cooperating
Parties**

None

Resources

If monitoring is to be intensive and deliberate, additional manpower would be needed. However, monitoring may be designed to rely on the observations of existing marine law enforcement personnel.

**Required
Legislation**

None

**Action Plan
#8.5**

Provide aerial reconnaissance to document existing watercraft use patterns in Barnegat Bay.

Rationale

Aerial reconnaissance is needed to monitor watercraft use on the Bay. This will help to identify congested areas, traffic hazard areas and areas prone to special uses (e.g., sail boards, jet skis) and alert boaters to potential conflicts.

**Lead
Responsibility**

1) N.J. Department of Environmental Protection and Energy (DEPE), Office of Land and Water Planning

**Cooperating
Parties**

1) DEPE, Bureau of Water Monitoring
2) N.J. State Police, Bureau of Marine Police

Resources

Funding is needed

**Required
Legislation**

None

Objective 2 To establish and maintain a system of priorities, funding and dissemination of research that adds to our knowledge of the human, physical and biological systems of the Barnegat Bay watershed; identifies causes and solutions of pollution problems and impaired uses; and assists decision-making activities of regulatory and management agencies while stimulating creativity and excellence in research.

**Action Plan
#8.6**

Develop a set of priorities for research in the Barnegat Bay. These priorities should be developed by consensus with the scientific community, resource managers, policy makers, other involved parties and the general public.

Rationale

Research is essential for understanding Barnegat Bay and its associated watersheds and for developing management options for the long-term protection of the Bay. Research and monitoring together will form the technical underpinning of the plan. Monitoring will establish baseline conditions and determine trends; research will take the monitoring findings and confirm the processes and relationships that underlie them. Research will also be integral to the development of more accurate, practical and cost-effective methods of monitoring and sample analysis.

**Lead
Responsibility**

The Barnegat Bay Research & Monitoring Subcommittee (both the N.J. Department of Environmental Protection and Energy (DEPE) and Citizens groups) should form the basis of an oversight group.

**Cooperating
Parties**

Representatives of academic institutions, state and federal agencies, the business community, agriculture, environmental groups and private research organizations.

Resources

- 1) Existing programs need to place a high priority on research and monitoring activities in Barnegat Bay, including greater allocation of program funds for this purpose.
- 2) A considerable amount of new funding is required to carry out the comprehensive monitoring program described in the plan. A major commitment of funds by the DEPE and/or legislature is required.

Required Legislation

New legislation should be introduced to further the mandate of the original Act to protect the environment of Barnegat Bay. The new legislation should provide funding for research into the basic biological, chemical and physical processes that determine the Bay's productivity and health.



**Action Plan
#8.7**

Develop a research program to understand sources, current loadings, cycling, and the Bay's assimilative capacity for pollutants, especially nutrients. Measure or determine through modelling:

- 1) The actual loading rates of pollutants to the Bay (including inputs via surface and groundwater discharges, aerial deposition, sediment releases, and direct inputs from human and natural sources).**
- 2) The ability of the Bay to assimilate pollutants (i.e., the pollutant loading capacity) without adverse impacts to Bay resources and uses.**
- 3) The amount and location of additional development (if any) that can be accommodated in the Bay watershed without exceeding the Bay's pollutant loading capacity. This analysis should consider potential loadings from sewered and unsewered development.**

Rationale

This research will provide a technical basis for more targeted land use and other controls in the future. Remediation efforts could also be targeted such that funds are expended on the most significant (or most remediable) pollutant sources. The results of such a study will be useful for estuary protection efforts underway in other areas of New Jersey, and in other states.

**Lead
Responsibility**

N.J. Department of Environmental Protection and Energy, Division of Science and Research; Bureau of Water Monitoring

**Cooperating
Parties**

- 1) N.J. Marine Science Consortium
- 2) Universities, colleges and other educational institutions
- 3) Ocean County Environmental Agency

Resources

Funding will be required to develop and implement a research program

**Required
Legislation**

None

**Action Plan
#8.8**

Determine whether beaching and launching craft from natural shorelines is causing significant erosion.

Rationale

Beach erosion is an ongoing natural force at the Bay's edge. Little research has been done to determine what effect beaching and launching watercraft from the beach has on erosion.

**Lead
Responsibility**

New Jersey Department of Environmental Protection and Energy (DEPE), Division of Science and Research

**Cooperating
Parties**

DEPE, Office of Land and Water Planning

Resources

Funding is needed for this study. The DEPE will have to allocate money from its general appropriation to fund this study.

**Required
Legislation**

None

**Action Plan
#8.9**

Establish a research program to document damage to submerged aquatic vegetation (SAV) populations from powerboat use. As part of this study a pilot program of posting shallow SAV habitat may be considered.

Rationale

Submerged aquatic vegetation provides many environmental benefits in the Bay. They serve as nursery and feeding habitats for numerous species of fish, crabs and shellfish, provide food for waterfowl, reduce wave energy and erosion, and contribute detritus to the estuarine food web. SAV grows in shallow water and is vulnerable to propeller damage from powerboats. Documentation is needed to determine the need to regulate boat use and educate boat operators of potential damage to SAV beds. If the program demonstrates that powerboat operation is having an adverse effect on Submerged Aquatic Vegetation, appropriate regulations should be adopted to minimize that damage.

**Lead
Responsibility**

N.J. Department of Environmental Protection and Energy (DEPE), Division of Science and Research

**Cooperating
Parties**

- 1) DEPE, Division of Fish, Game and Wildlife for research
- 2) DEPE, Division of Parks and Forestry and Division of Fish, Game and Wildlife for pilot posting project
- 3) N.J. Boat Regulation Commission and Department of Law and Public Safety for new boating regulations under N.J.A.C. 7:6-1.1 et seq. if the research concludes that those regulations are necessary

Resources

None

**Required
Legislation**

New boating regulations designed specifically to protect environmental resources, if needed, may require authority beyond that of Title 12 of the navigation statutes. Legislation amending R.S. 12:7-1 et seq. or supplementing Title 13 may be necessary to grant the authority for boating regulations based on the environmental considerations. Further legal interpretation is needed.

**Action Plan
#8.10**

Quantify the discharge of pollutants associated with motorboat usage, such as heavy metals, oil, grease, aromatic hydrocarbons and other pollutants. Monitor the ability of the Bay to assimilate these materials and the effect these pollutants have on the Bay's ecosystem.

Rationale

The operation of power vessels releases contaminants into the water from bilge pumpage and the motor itself. These contaminants include lead, heavy metals, oil and grease, carbon monoxide, aromatic hydrocarbons and the like. The discharge from an individual boat is known to be small in relation to the overall Bay. However, there is concern that the cumulative impacts of these discharges could have lethal or sub-lethal adverse effects on estuarine biota. Additional research is needed to quantify these discharges and assess their impact on the estuary prior to initiating any policy concerning restricting access to the Barnegat Bay or requiring changes to propulsion systems.

**Lead
Responsibility**

N.J. Department of Environmental Protection and Energy (DEPE), Division of Science and Research

**Cooperating
Parties**

N.J. Commercial Fishermen's Association

Resources

The DEPE will have to allocate money from its general appropriation to accomplish this study.

**Required
Legislation**

None

Action Plan #8.11	Develop quantitative and qualitative criteria for evaluating the ecological value of benthic communities, (Delaware uses a method developed by Luckenbach, Diaz and Schaffner, 1989) including standard sampling methods and procedures.
Rationale	These criteria would be used to assess the ecological value of the benthic community prior to approving new dredging. Required information could then be used to develop a data base for benthic resources.
Lead Responsibility	N.J. Department of Environmental Protection and Energy (DEPE), Division of Science and Research to develop benthic criteria
Cooperating Parties	DEPE, to implement benthic criteria through changes to the <u>Rules on Coastal Zone Management (N.J.A.C. 7:7E 1.1 et seq.)</u>
Resources	None
Required Legislation	None

**Action Plan
#8.12**

Determine where and when the Bay's capacity to support boating is exceeded. Document areas where vessel traffic is causing hazardous navigation conditions and assess the effectiveness of vessel operation restrictions in reducing that hazard. (See also Action Plan #4.15)

Rationale

Concern has been expressed over the numbers of vessels currently navigating on Barnegat Bay. The existing traffic needs to be evaluated in terms of the Bay's capacity to accommodate boating. Where the capacity has been exceeded no new facilities should be permitted. In the alternate, additional operation restrictions could be implemented to reduce potential hazards arising from congestion. This latter suggestion is preferable to restricting access to the Bay unless the volume of vessels on the Bay is documented to be causing significant environmental damage.

**Lead
Responsibility**

N. J. Department of Environmental Protection and Energy (DEPE), Division of Science and Research to assess the recreational boating capacity of Barnegat Bay

**Cooperating
Parties**

- 1) N.J. State Police, Bureau of Marine Law Enforcement to monitor traffic conditions on the Bay;
- 2) DEPE, Office of Land and Water Planning to develop new facility siting regulations, if necessary
- 3) DEPE, Land Use Regulation Program to implement new facility restrictions if developed.

Resources

Funding is needed to conduct the study of the recreational boating capacity of Barnegat Bay.

**Required
Legislation**

None. Authority to regulate waterfront improvements for the promotion of commerce and protection of navigation is afforded by R.S. 12:5-1 et seq.

**Action Plan
#8.13**

Measure the effectiveness, costs and benefits of filter screens placed under catch basin grates.

Rationale

Filter screens have been installed on a limited scale within the Barnegat Bay study area and could be effective tools in reducing floatables and other pollutants entering storm sewer systems. Preliminary results seem favorable for floatables control. Although not the primary targets, other pollutants such as oil and sediment are also captured. Despite these perceived benefits, most municipalities hesitate to use these screens because of clogging and maintenance concerns. Before these screens are embraced or rejected, their performance, costs and benefits should be documented.

**Lead
Responsibility**

N. J. Department of Environmental Protection and Energy

**Cooperating
Parties**

- 1) Municipal public works departments
- 2) Municipal health departments
- 3) Rutgers University

Resources

Funding for monitoring needed

**Required
Legislation**

None

**Action Plan
#8.14**

Conduct basic research on levels of toxic contaminants in the sediments, aquatic biota, and birds of the Bay.

Rationale

Such research will lay the groundwork for a potential monitoring program. It will also illuminate questions about pollutant fate and transport.

**Lead
Responsibility**

N. J. Department of Environmental Protection and Energy (DEPE), Division of Science and Research

**Cooperating
Parties**

- 1) DEPE, Division of Fish, Game and Wildlife
- 2) Ocean County Department of Health
- 3) Universities

Resources

Funding will be required for this research.

**Required
Legislation**

None

**Action Plan
#8.15**

Examine the relative impact of phytoplankton blooms and sediment re-suspension on turbidity changes.

Rationale

High turbidity levels can cause die-back of submerged aquatic vegetation. It is important to know the cause(s) of high turbidity in order to design meaningful control strategies.

**Lead
Responsibility**

N. J. Department of Environmental Protection and Energy (DEPE), Division of Science and Research

**Cooperating
Parties**

- 1) DEPE, Bureau of Monitoring Management
- 2) N.J. Marine Sciences Consortium
- 3) Universities

Resources

Funding will be required to undertake this research.

**Required
Legislation**

None

**Action Plan
#8.16**

Determine the extent and seriousness of physical abnormalities in indicator species, (e.g., fin rot in flounder, shell disease in blue crabs).

Rationale

This research will establish a foundation for future monitoring of important ecosystem indicators.

**Lead
Responsibility**

N. J. Department of Environmental Protection and Energy (DEPE), Division of Science and Research

**Cooperating
Parties**

- 1) DEPE, Division of Fish, Game and Wildlife
- 2) N.J. Marine Science Consortium
3. Universities
- 4) Commercial and sport fishing organizations

Resources

Resources will be required to undertake this research

**Required
Legislation**

None

**Action Plan
#8.17**

Investigate the difference between the Northern Barnegat Bay (above Route 37) and the lower sections of the Bay.

Rationale

Because of the restrictive influence of the Route 37 bridge pylons, the Northern Bay does not receive full tidal influences from Barnegat Inlet. Without full flushing and tidal exchange, the Northern Bay may act more like an inland "lake" with accompanying water quality problems. A research project should be designed to analyze the hydrography, salinity and water quality of this area, contrast it with the lower sections of the Bay, and make discrete recommendations in order to improve flow and water quality.

**Lead
Responsibility**

N.J. Department of Environmental Protection and Energy,
Division of Science and Research

**Cooperating
Parties**

Universities

Resources

Resources will be required to undertake this research.

**Required
Legislation**

None

**Action Plan
#8.18**

Examine the impacts of the recent dredging and reconfiguration of Barnegat Inlet on the hydrography, water quality and biotic diversity of the Bay.

Rationale

The new higher south jetty and planned channel dredging will significantly change the tidal prism, salinity and other hydrographic parameters of the Inlet. These changes will, in turn, affect the entire Bay. Research should be designed to examine the changes that will take place after construction and dredging.

**Lead
Responsibility**

N.J. Department of Environmental Protection and Energy,
Division of Science and Research

**Cooperating
Parties**

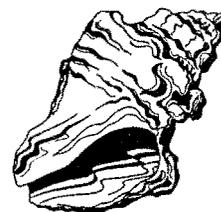
- 1) Army Corps of Engineers - Philadelphia District
- 2) Graduate schools

Resources

Resources will be needed to undertake this research

**Required
Legislation**

None



**Action Plan
#8.19**

Identify areas where potential wetlands mitigation projects could be implemented.

Rationale

Wetlands mitigation is a requirement for unavoidable wetlands loss under State permit programs. Further sites for potential mitigation need to be identified and the New Jersey Department of Environmental Protection's Geographic Information System file needs to be updated. There are some areas which have distinct potential for being returned to wetlands, notably some old lagoons that have not been built on yet and other undeveloped filled areas where tidal exchanges could be restored. In addition, some wetland forest areas could be purchased and added to the State's Natural Lands Trust, thereby satisfying a mitigation requirement.

**Lead
Responsibility**

N.J. Department of Environmental Protection and Energy,
Division of Science and Research

**Cooperating
Parties**

- 1) U.S. Environmental Protection Agency
- 2) N.J. Wetlands Mitigation Council
- 3) N.J. Natural Lands Trust

Resources

A grant should be requested from the U.S. Environmental Protection Agency

**Required
Legislation**

Changes are required to the N.J. Freshwater Wetlands Protection Act and/or the implementing rules.

**Action Plan
#8.20**

Complete a recreation facility needs study by:
a) **Conducting a professional survey of user demand**
b) **Completing a comprehensive inventory of existing access facilities**
c) **Deriving the deficits or surpluses**
d) **Identifying the priority facility needs by type of facility and general location**
(see also Action Plan #6.1B)

Rationale

A comprehensive access plan for Barnegat Bay would give the guardians of this resource - the coastal communities, County, and State - the framework for a region-wide effort to recognize, protect and improve access, and would give the public a long-range plan for developing and enjoying access opportunities. A recreation facility needs study would contribute to the development of this overall regional access plan.

**Lead
Responsibility**

Ocean County Planning Board should assume the lead in preparing the Public Access Plan for Barnegat Bay, including the recreation facility needs study

**Cooperating
Parties**

Assistance in preparing and implementing the Plan may be required from the following agencies:

- 1) N.J. Sea Grant Extension Service
- 2) Ocean County Parks & Recreation Department
- 3) NJ Department of Environmental Protection and Energy
 - a) Coastal Management Program
 - b) Green Acres Program
 - c) Division of Parks and Forestry
 - d) Division of Fish, Game and Wildlife

Technical assistance may be required from the following agencies:

- 1) N.J. Department of Commerce, Tourism Office
- 2) N.J. Department of the Public Advocate

Resources

- 1) Coastal Management Grant funds
- 2) Green Acres funds
- 3) Non-profit Grant organizations

**Required
Legislation**

Legislation is required to create a stable source of funding and/or for new bond issues to fund the N.J. Green Acres Program. (see also Action Plan #6.5)

**Action Plan
#8.21**

Conduct a comprehensive County Natural Diversity Inventory focusing on the identification of endangered and threatened species, rare flora, rare or exemplary vegetational communities, and critical wildlife habitats. Identify the best remaining habitats as priority sites for preservation of the natural diversity within the Barnegat Bay ecosystem.

Rationale

Current information on the natural resources of the Barnegat Bay ecosystem is incomplete and dated. A comprehensive and thorough inventory of the natural resources of the ecosystem is necessary in order to guide future development in an environmentally sound manner.

**Lead
Responsibility**

The following divisions of N.J. Department of Environmental Protection and Energy (DEPE) should undertake this inventory:

- 1) Division of Parks and Forestry, Office of Natural Lands Management, Natural Heritage Program
- 2) Division of Fish, Game and Wildlife, Endangered and Non-game Species Program

**Cooperating
Parties**

- 1) U.S. Fish and Wildlife Service
- 2) DEPE, Office of Environmental Services
- 3) County and municipal agencies
- 4) The Association of New Jersey Environmental Commissions
- 5) Private conservation groups

Resources

Existing funds are inadequate to undertake this inventory. Additional funds may be sought through coastal zone planning grants, DEPE Office of Environmental Service Local Assistance Grants, and private funding. Additional legislative appropriations could also be sought.

**Required
Legislation**

None

GLOSSARY

abutments	the supporting structure at either end of a bridge
ambient	surrounding; encompassing on all sides. Specifically, existing environmental conditions, contaminant levels, rates, or species in the environment.
anadromous	marine or estuarine species of finfish that spawns in freshwater.
anadromous fish spawning runs	anadromous fish are saltwater species which spawn in rivers. Anadromous fish spawning runs are waterways which serve as passages for fish to or from seasonal spawning areas. The two principal species of concern within the Bay watershed are the blueback herring (<i>Alosa aestivalis</i>) and the alewife or river herring (<i>A. pseudohareng</i>). The herring are important commercially as a source of human food, bait, fish meal and oil. Herring are also an important component in the food web as a food source for other marine species.
anthropogenic	effects or processes that are derived from human activity, as opposed to natural effects or processes that occur in the environment without human intervention
aquaculture	use of a permanently inundated water area, whether saline or fresh, for the purpose of growing and harvesting plants or animals in a way to promote more rapid growth, reduce predation, and increase harvest rate
aquatic ecosystem	waters of the United States, including wetlands, that serve as habitat for interrelated and interacting communities and populations of plants and animals
assimilative capacity	the ability of a natural system to absorb and neutralize pollutants before it begins to display a significant reduction in the biological diversity, chemical, and/or physical quality

Atlantic flyway	generalized waterfowl migratory pathway covering the eastern quarter of North America
bacteria	typically one-celled micro-organisms which have no chlorophyll, multiply by simple division, and can only be seen with a microscope. Some bacteria cause disease (e.g. pneumonia), but others are necessary for nitrogen fixation, etc.
barrier island	a wavebuilt deposit of sand mainly, raised above sea-level by constructive wave action and separated from the shore by a lagoon.
bay beaches	beaches are vital to the economic and ecological vitality of New Jersey. Sandy bay beaches are recreationally important for families with small children as a safer alternative to ocean beaches because the currents and wave actions are not as strong. Bay beaches provide valuable forage areas for a variety of wading birds.
bay islands	islands within the bay. Bay islands support valuable wildlife habitats or have potential habitats through implementation of proper management techniques. Sandy areas are used by beach nesting birds while vegetated areas support colonial birds.
benthic	occurring or living on or in the bottom of a water body
Best Management Practices (BMP)	a method, activity, maintenance procedure, or other management practice for reducing the amount of pollution entering a water body
bilge pumpage	water which has collected in the bilge or lower part of a ship's hold, has become foul and is pumped from the ship
biotic	the plant and animal assemblage of a biological community
bivalve	an aquatic invertebrate animal of the class Bivalvia. Bivalves, such as clams and oysters, have two shells (valves) and most are filter feeders.
buffer	an area between a sensitive site and development site which cushions and lessens the conflict between the two sites

carrying capacity	the ability of the natural and built environment to absorb or receive development
catadromous	freshwater fish that return to the ocean to spawn
Clean Water Act	an act passed by Congress in 1987 that amends the Federal Water Pollution Control Act. The objective of the Clean Water Act is to restore and maintain the integrity of the nation's waters.
climatologic/climatology	the science dealing with climates, or weather conditions
coastal wetlands	see "wetlands". Coastal wetland vegetation contributes to the production of organic matter upon which the viability of the Bay ecosystem depends. Shellfish and finfish rely on coastal wetlands for cover, feeding and breeding. Coastal wetlands also provide valuable water quality maintenance functions necessary to the health and stability of the bay ecosystem. Peregrine falcons (<i>Falco peregrinus</i>), ospreys (<i>Pandion haliaetus</i>) and Northern harriers nest in marsh areas within the Bay watershed. Raptors are the highest components in the marsh food chain and are indicators of pollution and contamination. These species are also listed as endangered or threatened.
Coastal Zone Management Act	The Coastal Zone Management Act of 1972 (P.L. 101-508, November 5, 1990), is designed to give coastal states the financial means, policy guidance and technical assistance to help them establish and maintain Coastal Zone Management programs that meet Federal objectives.
coliform bacteria	a type of bacteria that is coil or helix shaped. Fecal coliform bacteria are those coliform bacteria that are found in the intestinal tracts of mammals. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces. These organisms may also indicate the presence of pathogens that are harmful to humans. High numbers of fecal coliform bacteria therefore limit beneficial uses such as swimming and shellfish harvesting.

colonial waterbird nesting sites	these sites, primarily islands in the Bay, are nesting areas for large aggregations of several bird species. Colonial waterbirds are at the top of the food chain and provide important indicators of environmental health and contamination. These sites are also habitat for four endangered and threatened waterbird species.
conservation easements	an easement precluding future or additional development of the land.
contaminant	a substance that is not naturally present in the environment or is present in amounts that can, in sufficient concentration, adversely affect the environment.
crab pot	a trap used to catch crabs
cross connections	unintended or illegal connections between storm sewers and sanitary sewers
cull ring	a device in a crab pot which prevents legal sized crabs from escaping but allows undersized crabs to exit
cumulative impacts	the total effect of a series of actions or activities as opposed to that of a single one. For example, the impacts of all wetland filling that has occurred in a given watershed, as opposed to the impacts of a single project
decomposer portion (of the food web)	organisms which break down organic matter and release chemical elements and compounds for use in the environment
degradation	diminution or reduction of value or quality
depuration	the process by which potentially contaminated shellfish are cleansed prior to human consumption. After harvest, shellfish are held in controlled conditions for a sufficient length of time to purge pathogenic organisms.
detention basin	a facility for the temporary storage of stormwater runoff

detritus	particulate matter, especially of vegetative origin in varying stages of decomposition
dredge spoil	mud, silt and sand which has been removed from the bottom of a water body, generally to allow safe navigation
dune	a rounded hill or ridge of sand heaped up by the action of the wind. Dunes are a dynamic natural phenomenon that help protect lives and property in adjacent areas from effects of major natural coastal hazards such as hurricanes, storms, flooding and erosion. Dune systems help promote wide sandy beaches and provide important habitats for wildlife species.
ecosystem	a system made up of a community of animals, plants, and bacteria and its interrelated physical and chemical environment
endangered	a species whose prospects for survival within the State are in immediate danger due to one or many factors: A loss of or change in habitat, over exploitation, predation, competition, disease. An endangered species requires immediate assistance or extinction will probably follow. See N.J.A.C. 7:25-4.12(b) for listing.
endangered and threatened species habitat	the native environment of species which are facing extirpation in the Bay watershed and perhaps, extinction worldwide. This endangerment is often due to loss of suitable habitat and over exploitation through human activities. These species are integral components of ecological communities and are needed to sustain the health of the ecological systems of the Bay watershed area. Their disappearance from the Bay would represent a loss to the quality of the ecological systems as well as a loss to research and education.
environmentally sensitive area	an area which tends to suffer impairment of the physical, biological, social or aesthetic quality of the resource when disturbed. Examples include: aquifer recharge areas, dunes, beaches and shorelines, flood plains, habitats of endangered and threatened

	species, staging areas for migratory species, stream corridors, wetlands, wildlife corridors
erosion	wearing away of rock or soil by the gradual detachment of soil or rock fragments by water, wind, ice, and other mechanical and chemical forces.
estuarine	of, relating to, formed, or living within an estuary.
estuary	any confined coastal water body with a connection to the sea, diluted by outflowing fresh water and with a quantity of marine salt in the waters greater than 0.5 parts per thousand (ppt). Estuaries provide habitats for rare, endangered, recreational and commercial wildlife and provide stopover sites for migratory waterfowl. Estuaries provide water quality and flood control functions and serve as important aesthetic, sport and recreational resources.
fauna	a collective term for the animal species present in an ecosystem
floatables	items which stay on the surface or remain suspended near the surface of the water. Generally used to refer to pollutants such as plastic jugs and 6-pack can holders.
flood control	a means of restraining or holding back the temporary overflowing of water onto land which is usually devoid of surface water
flood plain	the channel and relatively flat area adjoining the channel of a stream or river which has been or may be covered by flood water
flora	a collective term for the plant species present in an ecosystem
forests	a thick growth of trees and underbrush covering an extensive tract of land. Trees guard and renew the quality and yield of water entering the bay. Trees have the capability to separate chemicals and nutrients, filter and trap sediment, mitigate the effect of rising temperature by shading streams and wetlands, and control the duration, rate and continuity of water yield. Forests stabilize soil, retard erosion, promote infiltration of surface water, provide food, shelter and breeding sites for wildlife and add

aesthetic value for recreation. Trees release oxygen, provide food and fuel without cultivation.

freshwater
wetlands

See "wetlands". Freshwater wetlands provide a variety of benefits to numerous communities. Wetlands provide habitats for rare and endangered flora and fauna as well as recreationally and commercially important wildlife; provide natural storage for flood control and recharge areas for groundwater; and provide open space.

furbearer habitat

The natural environment of mammals having thick hair covering their bodies. Bay islands, streams and rivers throughout the Bay watershed have supported populations of river otter, muskrat, mink and beaver. Beavers play an important role in the watershed by their alteration of habitat which enhances the use of the area by other species. Furbearers, such as otter and mink, are important indicators of environmental health and quality because of their high position on the food chain.

fyke

a long bag net used as a fish trap

habitat

the area or type of environment in which an organism or biological population normally lives or occurs

hard clam
(*Mercenaria mercenaria*)
depurating relay beds

clams feed by pumping large quantities of water across their gills. As they remove nutrients suspended in the water, they also remove impurities and pollutants that may be present. Clams concentrate these pollutants in their tissues, and although many of the pollutants do not harm clams, they can be harmful to humans who consume them. Relay stations are special areas in cleaner waters where clams are brought to rid themselves of bacterial contaminants before they are harvested and sent to market. Relay beds have facilitated the utilization of a hard clam resource that might have been underutilized or not utilized at all. The continued success of the relay program is dependent upon acceptable water quality. Additional pollution in the bay has resulted in a water quality downgrading and abandonment of the Swan Point relay beds in February of 1992.

headwater	the upper part of a river, near its source, or one of the streams that contribute their waters to form a larger stream
hog ring	a metal ring set in a clam pot and used to retrieve it
hydrologic/hydrology	the science dealing with the waters of the earth, their distribution on the surface and underground, and the cycle involving evaporation, precipitation, flow to the seas, etc.
impervious	a surface that cannot be easily penetrated. For instance, rain does not readily penetrate asphalt or concrete pavement.
indigenous	having originated in and being produced, growing, or living naturally in a particular region or environment; native species.
infiltration trenches	a structure to collect and provide temporary storage of surface runoff from a storm and to allow subsequent gradual infiltration to surrounding soil. Infiltration provides ground water recharge and reduces the volume of runoff
infrastructure	a facility or facilities, frequently linear, which transport(s) people, materials, energy or information, and upon which development is dependent.
interconnections	the non-physical connection of a sanitary sewer system with a stormwater system. Interconnections may include, but are not limited to, lakes, flows and overflows from the sanitary system into the stormwater system or vice versa.
intermittent stream corridors	an intermittent stream flows periodically, rather than continuously. Because these streams are sometimes dry, they do not tend to have related wetlands and do not benefit fully from wetlands protection. Intermittent stream corridors provide open space and habitats for wildlife and are travel corridors between large habitat complexes.
intertidal and subtidal shallows	shallows are defined as all permanently or twice daily submerged areas from the high water line to a depth of four (4) feet below the low water line. Shallows play a critical role in estuarine ecosystems.

Shallows are ecological edges where material and energy exchanges between land and water occur. They are critical habitat for many benthic (bottom dwelling) organisms and are critical forage areas for fishes and migratory waterfowl. Sediments deposited in shallows contain much organic detritus from decaying vegetation. Food webs in these areas are an important factor in the maintenance of estuarine productivity.

landings	the amount of finfish or shellfish harvested and brought ashore
land use	the way land is developed and used in terms of the types of activities allowed (agriculture, residences, industries, etc.) and the size of buildings and structures permitted. Certain types of pollution problems are often associated with particular land use practices, such as sedimentation from construction activities.
marina	a waterfront facility predominantly used for the dockage (wet or dry stack) or moorage for recreational boats, for which a dockage or moorage fee is charged
MARPOL	an international treaty for reduction of marine pollution
master plans	a comprehensive long-range plan intended to guide the growth and development of a community or region and one that includes analysis, recommendations and proposals for the community's population, economy, housing, transportation, community facilities and land use
mean high water (MHW)	a tidal datum; the arithmetic average of the heights observed over a specific 18.6 year Metonic cycle, at the end of which the phases of the moon recur in the same order and on the same days as in the preceding cycle.
mean low water (MLW)	a tidal datum; the arithmetic average of the low heights observed over a specific 18.6 year Metonic cycle
Memorandum of	

Understanding	a signed agreement between multiple parties
migratory	to move from one region to another with the change in seasons as with many birds and some fishes
multi-chamber catch basin	an inlet designed to intercept and redirect surface water and remove pollutants
nitrogen loadings	the amount of nitrogen that enters an aquatic system in various chemical forms and from various sources, such as runoff, rivers and storm drains
nonpoint source pollution	pollution that enters water from dispersed and uncontrolled sources (such as surface runoff) rather than through pipes. Nonpoint sources (e.g., forest practices, agriculture practices, on-site sewage disposal, and recreational boats) may contribute pathogens, suspended solids, and toxicants. While individual sources may seem insignificant, the cumulative effects of nonpoint source pollution can be significant.
nutrient cycle	the process by which nutrients, such as nitrogen, pass between various components of an ecosystem, such as the sediments, water, phytoplankton, zooplankton and fish
pathogen	an agent such as a virus, bacterium, or fungus that can cause disease in humans. Pathogens can be present in municipal, industrial, and nonpoint source discharges to the Bay.
petrochemicals	a chemical derived ultimately from petroleum or natural gas
phytoplankton	the single-cell plant component of plankton.
piscivore	an animal that eats fish
plankton	the usually microscopic animal and plant life found floating or drifting in the ocean or in fresh water and used as food by nearly all aquatic animals
pollutant	a contaminant that adversely alters the physical, chemical, or biological properties of the environment. The term includes pathogens, toxic metals, carcinogens, oxygen-demanding materials, and all

other harmful substances. With reference to nonpoint sources, the term is sometimes used to apply to contaminants released in low concentrations from many activities which collectively degrade water quality. As defined in the federal Clean Water Act, pollutant means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water.

pollutant loading	the amount of pollution that enters an aquatic system in various chemical forms and from various sources, such as runoff, rivers and storm drains
ponds and lakes	inland bodies of fresh water, often artificially created. These water bodies provide sources of potable water. Ponds and lakes are natural containment facilities for flood control. These waterbodies provide habitat for rare, endangered and recreational wildlife and migratory waterfowl. They also provide recreation opportunities to bathers.
rare and exemplary communities	these are large viable ecosystems with native characteristic flora and fauna in which natural ecological processes occur with a minimum of adverse impacts from humans or exotic species. Although a comprehensive study has not been undertaken of the Bay watershed, the dune woodland forest at Island Beach and the dwarf pine plains have been identified as rare natural communities.
referendum	the submission of a proposed law to a direct vote of the people
remediation	the process of correcting or overcoming problems
retention basins	a pond, pool or basin used for the permanent storage of water runoff
retrofit	a change in design, construction or equipment already in operation in order to incorporate later improvements

revetments	a retaining wall; any device for retaining or protecting a bank or slope
rhizomes	a rootlike stem under or along the ground ordinarily in a horizontal position, which sends out roots from its lower surface and leafy shoots from its upper surface
riparian	of, adjacent to, or living on, the bank of a river or, sometimes, of a lake, pond, etc.
secondary impacts	secondary impacts are the effects of additional development likely to be constructed as a result of the approval of a particular proposal. Secondary impacts can also include traffic increases, increased recreational demand and any other offsite impacts generated by onsite activities which affect the site and surrounding region.
Section 309	refers to Section 309 of the Federal Coastal Zone Management Act which focuses on eight areas potentially needing program improvements and enhancements within the coastal states. The enhancement area which is applicable to Barnegat Bay and under which the State of New Jersey should seek appropriate funding is Cumulative & Secondary Impacts.
sedimentation	the process of gravitational deposition of organic and/or inorganic suspended particles by water
sensitive areas	see "environmentally sensitive areas"
septic systems	an underground individual sewage system with a septic tank used for the decomposition and treatment of domestic wastewater
setbacks	the distance between a lot line and the edge of a building or improvement
Sewage Infrastructure Improvement Act (SIIA)	an Act passed by the N.J. State Legislature designed to address both point and nonpoint sources of pollution associated with stormwater sewer systems
shellfish	an aquatic animal, such as a mollusk (clams and snails) or crustacean (crabs and shrimp), having a shell or shell-like exoskeleton

shellfish habitats	shellfish habitats are defined as estuary or river bottoms that have a history of production for hard clams, soft clams, oysters, bay scallops or mussels. These shellfish are important to recreational and commercial fisherman. Young clams are also important forage food for a variety of finfish and migratory waterfowl.
silt	fine particulate matter suspended in water and later deposited on water body bottom
spawning	the reproductive act of lower organisms where fertilization of eggs is usually external
stormwater runoff	waters which result primarily from surface runoff and includes street wash water and drainage
stormsewer system	the designed infrastructure within a municipality which collect, convey, channel, hold, inhibit or divert the movement of stormwater
subdivision	the division of a lot, tract or parcel of land into two or more lots, tracts, parcels or other divisions of land for sale, development or lease
Submerged Aquatic Vegetation (SAV) habitats	SAV habitats consist of estuarine water areas supporting rooted vascular seagrasses such as eelgrass (<i>Zostera marina</i>) and widgeon grass (<i>Ruppia marina</i>). SAV habitats provides many environmental benefits including serving as nursery and feeding habitats for numerous species of fish, crabs and shellfish, providing food for waterfowl, reducing wave energy and erosion, and contributing detritus to the estuarine food web.
swale	a low lying or depressed land area, commonly wet or moist, which can function as an intermittent drainage way
threatened	a species that may become endangered if conditions surrounding it begin to or continue to deteriorate
topography	features of a region, including hills, valleys, rivers, lake, etc.
toxic	poisonous, carcinogenic, or otherwise directly harmful to life

tributary	a stream that flows into a larger stream or body of water
turbidity	reduced water clarity resulting from presence of suspended matter
Type III marine sanitation devices	toilet facilities on a boat which empty into a holding tank
wake	the track left by a ship or other body in the water usually in the form of waves moving from and at an angle to the ship or other body
waterfowl habitats	the natural environment of water birds. The Barnegat Bay, as a result of its location along the Atlantic flyway, provides critical habitat for migratory and overwintering populations of many species of waterfowl.
water quality design storm	a one-year frequency, 24-hour storm using the rainfall distribution recommended for New Jersey by the U.S. Soil Conservation Service or a storm of 1.25 inches of rainfall in two hours
water quality standard	policies, classifications and criteria to protect the designated uses of the State's waterbodies
watershed	the geographic region within which water drains into a particular river, stream, or body of water. A watershed includes hills, lowlands, and the body of water into which the land drains. Watershed boundaries are defined by the ridges of separating watersheds.
wetlands	habitats where the influence of surface or groundwater has resulted in development of plant or animal communities adapted to aquatic or intermittently wet conditions. Wetlands include tidal flats, shallow subtidal areas, swamps, marshes, wet meadows, bogs, and similar areas.
wetlands buffers	buffer areas are located between wetlands and development to lessen negative impacts any development may have upon wetland areas. Buffers accommodate variations in wetland boundaries due

to fluctuation in hydrology or climatology. Buffers act as mediation and filtration areas to remove and store nutrients, sediments and pollutants as they move from uplands to wetlands. The buffer reduces the adverse impact of human activities on wetlands and the flora and fauna which depend on these areas for habitat.

wildlife corridors

the stretch of cover which spans the gaps between larger wildlife habitats. Corridors include hedgerows and fencerows, wooded stream banks, strips of forest, swamp and riverine trees, etc. Corridors are seen as necessary escapes for animals in danger of flood or fire, as biotic pipelines and as habitat.

zooplankton

the animal component of plankton

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